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Role of science and technology in the context of international security and disarmament

Current developments in science and technology and their potential impact on international security and disarmament efforts

Report of the Secretary-General

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I. Introduction

1. In paragraph 2 of its resolution 72/28, on the role of science and technology in the context of international security and disarmament, the General Assembly requested the Secretary-General to submit to the Assembly at its seventy-third session a report on current developments in science and technology and their potential impact on international security and disarmament efforts, with an annex containing submissions from Member States giving their views on the matter.

2. Throughout history, science and technology have overwhelmingly been forces for good in society and continue to be so today. They are key enablers in efforts to implement the 2030 Agenda for Sustainable Development. It is important that any efforts to govern new weapons technologies or weapons applications of new technologies do not hamper the economic and technological growth and innovation of any State.

3. There are, however, growing concerns that developments in science and technology of relevance to security and disarmament are outpacing, and in some cases risk sidelining, norm development. As the Secretary-General laid out in his report entitled "Securing our common future: an agenda for disarmament", released in May 2018, the international community must remain vigilant in understanding new and emerging weapon technologies that could imperil the security of future generations. New weapon technologies pose possible challenges to existing legal, humanitarian and ethical norms; non-proliferation; international stability; and peace and security.

4. The present report is therefore aimed at providing an overview of recent developments in science and technology of relevance to the means and methods of warfare; drawing attention to the possible security implications of these developments, both individually and in convergence; document multilateral efforts to address these issues; and making recommendations on how to enhance these efforts. It should be noted that the fields of science and technology discussed in the present report are at various stages of advancement. The report is restricted to applications that could feasibly be fielded within the next five years. At the same time, the report does not address in depth the issue of the use of information and communications technologies in the context of international security, as this topic has been studied comprehensively by five groups of governmental experts since 2004 (see para. 74 below).

II. Recent developments in science and technology of relevance to the means and methods of warfare

A. Artificial intelligence and autonomous systems

Artificial intelligence

5. There is no universally agreed definition of artificial intelligence. The term has been applied in contexts in which computer systems imitate thinking or behaviour that people associate with human intelligence, such as learning, problem-solving and decision-making. Modern artificial intelligence comprises a set of sub-disciplines and methods that leverage technology, such as data analysis, visual, speech and text recognition, and robotics. Machine learning is one such sub-discipline. Whereas hand-coded software programmes typically contain specific instructions on how to complete a task, machine learning allows a computer system to recognize patterns in large data sets and make predictions. Deep learning, a subset of machine learning, implements various machine-learning techniques in layers based on neural networks,

a computational paradigm loosely inspired by biological neurons. Machine-learning techniques are highly dependent on the quality of their input data, and arguably the quality of the data is more important to the success of a system than is the quality of the algorithm.

6. Artificial intelligence has wide-ranging civilian applications, and the majority of artificial intelligence-related research and development occurs in the civilian sphere. Recent advances in artificial intelligence have been fuelled by large commercial investments, faster processors and the availability of ever larger data sets. Image recognition and image generation have improved significantly in recent years. Speech recognition, language comprehension and vehicle navigation have also seen significant progress. Despite these advances, it has been argued that more generalized artificial intelligence abilities, such as automated planning, are still not sophisticated enough to be useful for the vast majority of the battlefield applications that could be envisaged.

Autonomous systems

7. Autonomous systems execute tasks without human input or control, once activated. Autonomous systems can be broken down into systems that (a) require human input at some point during the execution of the task (human in the loop; semi-autonomous), (b) execute tasks independently but under the supervision of a human who can intervene (human on the loop), and (c) operate independently of human involvement or supervision (human out of the loop; fully autonomous). The elements of an autonomous system can be integrated into one machine or distributed across multiple networked machines. Recent advances in autonomous systems have been driven by developments in artificial intelligence, as described above, as well as by developments in various enabling technologies such as light detection and ranging sensors and stereoscopic computer vision.

8. Autonomy is distinct from automation. An automatic system has predictable preprogrammed outputs corresponding to a set of known possible inputs. An autonomous system uses an algorithm in pursuit of its objectives to respond to unanticipated inputs in ways that cannot be specifically predicted or, in some cases, even understood. While automatic systems can consist solely of hardware, some form of software, including software that incorporates elements of artificial intelligence, is necessary (but not always sufficient) to create an autonomous system.

9. If conceived of in terms of an observation, orientation, decision and action loop, an artificial intelligence system is theoretically capable of conducting the observation, orientation and decision functions, but not necessarily the action function. For an autonomous cyber system, software could also execute an action. For other autonomous systems, some form of hardware would generally be required to execute an action. This hardware can take various forms. Areas of technological innovation of relevance to a military context include unmanned platforms and robotics.

10. Unmanned aircraft have been fielded for more than a century, both in fixed-wing and rotary-wing configurations. They have numerous civil, commercial and military applications. They range from cheap, commercially available systems that fit in the palm of a hand with an endurance of minutes to large military systems with maximum take-off weights in excess of 3,000 kg and an endurance of dozens of hours. A related category is systems that have been designed to function as loitering munitions; like cruise missiles, they have weapons or warheads integrated into their airframes and are designed for single use, but unlike cruise missiles, they can be piloted remotely or can navigate autonomously. While unmanned aircraft are the most widely adopted variety of unmanned vehicle today, remotely piloted surface, submarine and land vehicles are also deployed by a number of military forces.

Unmanned vehicles generally have greater persistence and expendability than manned vehicles. Groups of networked unmanned vehicles can act as swarms.

11. Robots can use wheels, tracks or legged locomotion. They can be automatic, remotely operated or, coupled with the appropriate software, autonomous. Battery life and weight constraints remain obstacles to their deployment. There have recently been significant advances in robotics, including the achievement of advanced legged locomotion.

Military applications and implications

12. Several States have made public statements on the importance they attach to artificial intelligence in meeting future security and defence requirements. Some military forces are already testing or fielding a variety of artificial intelligence and autonomous systems. Mobility is currently the predominant application of autonomy in military systems. Examples of systems and applications near or in the early stages of deployment include: unmanned aircraft capable of autonomous carrier-based take-off and landing and autonomous aerial refuelling; unmanned naval vessels capable of autonomous navigation, including autonomously complying with maritime laws and conventions and autonomously interacting with adversaries; autonomous soldier support and ground transport systems; systems that control multiple unpiloted vehicles of various kinds; coordinated mobility and swarming systems; systems that sort and analyse intelligence data, including imagery; defensive and offensive cyber systems; human-machine collaborative decision-making applications; and war-gaming, simulation and training applications.

13. Autonomous weapons systems are generally understood to be weapons systems that employ autonomous functions in the use of force, namely target selection and engagement. Weapons systems may employ autonomy in other functions, such as navigation, but would not generally be considered autonomous weapons systems in such cases. The definition of an autonomous weapons system and the question of whether or not such a system exists today are the subject of active international debate.[1] However, some systems already deployed are at least technically capable of selecting and engaging targets autonomously, although they may not be deployed in a fully autonomous configuration.

14. In most of these applications, artificial intelligence and autonomous systems complement, rather than replace, humans. In many applications it is the speed and scalability[2] of an artificial intelligence or autonomous system that makes it attractive. In addition, machines and algorithms are not subject to all of the same physical constraints as humans, such as requiring food and sleep to operate optimally, and being able to operate only in limited environmental and climatic conditions.[3] Artificial intelligence, as with more straightforward computing, is capable of performing relatively routine tasks with a high degree of accuracy and reliability, thereby freeing up human resources for other tasks. The ability of artificial intelligence to arrive at a novel solution to a problem can also be a motivating factor for military forces.

15. Increasing autonomy in military systems, particularly in weapons systems, could have various implications for international security. A consequence of the complexity of an artificial intelligence system is that the outputs of such a system may never be entirely predictable or explainable. Moreover, this unpredictability

[1] See CCW/GGE.1/2017/CRP.1 and CCW/GGE.1/2017/3.

[2] "Scalability" is used here to mean the ability to increase the number of tasks or operations performed without increasing the number of human operators.

[3] Machines and algorithms can also have additional requirements compared with humans, such as power sources.

means that when algorithms fail, they do so in ways a human operator never would. The fact that a human operator or supervisor cannot necessarily understand how an artificial intelligence system arrives at a given output, regardless of its success or predictability, may also prove problematic. [4] Excessive reliance on, or the inappropriate use of, autonomy could have negative implications for escalation control. It should also be noted that some degree of autonomy in military systems could have security benefits by, for example, reducing instances of human error. It is worth repeating in this context that autonomy is not an absolute term and that some or all of the implications discussed here may be managed or mitigated by using autonomy in conjunction with, and not instead of, humans. It is also worth noting that the prospect of autonomous weapons raises ethical and legal concerns that are beyond the scope of the present report, but which are the subject of active consideration by Member States.

Relevant intergovernmental processes, bodies and instruments

16. Pursuant to the Fifth Review Conference of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, a group of governmental experts on emerging technologies in the area of lethal autonomous weapons systems was established and met for the first time in November 2017. At the 2017 Meeting of the High Contracting Parties the mandate of the group was extended; it met in April 2018 and is scheduled to meet for another one-week session in August 2018. It will report to the Meeting of High Contracting Parties in November 2018.

17. The United Nations Institute for Disarmament Research (UNIDIR) managed a project in 2016 and 2017, which involved discussions among a number of States, resulting in a study entitled "Increasing transparency, oversight and accountability of armed unmanned aerial vehicles". UNIDIR will conduct a follow-up project commencing in 2018. The process focused on the legal and security concerns raised by the proliferation and use of armed unmanned aircraft and strategies for addressing those concerns, rather than their potential to be used as platforms for autonomous systems.

B. Biology and chemistry

18. The development, production, stockpiling, acquisition, transfer and use of chemical and biological weapons has long been prohibited under international law. The norms against the hostile uses of chemistry and biology are enshrined in the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction (Biological Weapons Convention), and the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction. These norms have been maintained for many years, although there have been multiple cases of chemicals being used as weapons in recent years. There are, however, concerns that advances in chemistry and biology could undermine these norms.

19. With regard to biological weapons, previous challenges to acquisition associated with either the synthesis of existing agents or the development of novel agents have been overcome by using gene transfer and other biosynthetic engineering approaches.

[4] Artificial intelligence systems capable of explaining themselves are an active area of civilian and military research.

Scientists have shown that it is possible to synthesize viruses and bacteria in the laboratory, and previously extinct diseases have been recreated. While motivated by a desire to better understand such diseases, this kind of research raises concerns due to its dual use implications. The modification of biological agents can enhance their utility as biological weapons, for example by improving their pathogenicity, circumventing host immunity, enhancing transmissibility and host range, improving antimicrobial and drug resistance and boosting their environmental stability. Recent attention has focused on genome editing, and techniques such as clustered regularly interspaced short palindromic repeats, which raises ethical and security questions and concerns. [5] Developments in production technologies have reduced production signatures, meaning that less space and time are needed to develop biological weapon agents, thus narrowing windows for detection and interdiction. Advances in areas such as nanoparticles and the sophisticated modelling of dispersal patterns using aerobiology techniques have also contributed to the increased ease with which biological agents can now be delivered.

20. With regard to chemical weapons, the remarkable progress made in understanding life processes at the molecular level brings with it a greater ability to manipulate and interfere with life processes through chemical means. Capabilities in these areas are expected to continue to grow in the foreseeable future. Computational tools to design molecules that can target specific cell types (e.g., organs) and highly active pharmaceutical-based chemicals that act on the central nervous system have led to concerns about the possibility of new types of toxic chemical agents. [6] In addition, the widespread availability of knowledge on the construction of improvised chemical dispersal devices and easy access to commercial chemicals have resulted in concerns about the increased risk of chemical terrorism. In this regard, access to new tools for dispersal, such as modified unmanned aircraft vehicles, could be an enabler for the weaponization of chemicals.

21. The growing crossover between the traditional disciplinary boundaries dividing biology and chemistry also needs to be taken into account. Bulk, fine and in particular specialty chemicals are increasingly being produced using biologically mediated processes, such as microbial fermentation or the use of enzymes as catalysts. In addition, substantial advances have been made in the chemical synthesis of molecules of biological origin. In industry and academia, multidisciplinary research teams are becoming the norm and expanding even beyond biology and chemistry to fields such as physics, computing, engineering, materials science and nanotechnology. This convergence provides significant benefits, for example in health care, alternative energy sources and environmental control. Together with other advances, particularly in nanotechnology, this cross-disciplinary work is also being exploited to develop improved defensive countermeasures against chemical and biological warfare agents. However, these new production processes, combined with developments in drug discovery and delivery, could be exploited in the development of new toxic chemicals that could be used as weapons. While the convergence of chemistry and biology is not assessed as impacting on the scope of the prohibitions in the Biological Weapons Convention and the Chemical Weapons Convention, it may have implications for the implementation of both treaties, particularly the Chemical Weapons Convention with its detailed verification regime.

[5] See, for example, InterAcademy Partnership, "Assessing the security implications of genome editing technology: report of an international workshop" (2017), available at http://www.interacademies.org/43251/Assessing-the-Security-Implications-of-Genome-Editing-Technology-Report-of-an-international-workshop.

[6] It should, however, be noted that recent incidents have involved known chemical warfare agents, such as sulfur mustard, prepared using a method published in the nineteenth century, and organophosphorus nerve agents developed before and during the Cold War.

Relevant intergovernmental processes, bodies and instruments

22. Both the Biological Weapons Convention and the Chemical Weapons Convention have provisions for five-yearly review conferences, in which the review of relevant scientific and technological developments is a major function. The Eighth Review Conference of the Biological Weapons Convention was held in 2016 and the Organization for the Prohibition of Chemical Weapons (OPCW) is currently preparing for its Fourth Review Conference in November 2018.

23. Besides the review conferences, both treaties also have more regular means of reviewing relevant developments in science and technology. The Chemical Weapons Convention established a Scientific Advisory Board consisting of 25 eminent scientists, which meets at least once a year and can establish temporary working groups on specific topics. The Scientific Advisory Board recently produced a comprehensive report on developments in science and technology prior to the Fourth Review Conference of the Chemical Weapons Convention in November 2018.[7]

24. While proposals for a similar advisory body for the Biological Weapons Convention have been made, it has so far not been possible for States parties to agree to such an approach. From 2012 to 2015, a review of developments in the field of science and technology related to the Convention was a standing agenda item considered by States parties on an annual basis. Starting in 2018, States parties have agreed to establish an annual Meeting of Experts to review developments in the field of science and technology related to the Convention, and the Meeting will address five specific topics on an ongoing basis until 2020. On a less formal basis, for many years there have been discussions among scientists, coordinated in particular by the InterAcademy Partnership, relating to the governance of dual-use research in the life sciences.[8] With a grant from the European Union, the Office for Disarmament Affairs is also midway through holding a series of five regional workshops on the implications of advances in science and technology for the Biological Weapons Convention.

25. From 2011 to 2013, a temporary working group under the OPCW Scientific Advisory Board considered convergence and interacted with the Biological Weapons Convention community. In its report, the group made recommendations on sustaining this interaction.[9] Since 2014 a conference on convergence has been organized in Switzerland every two years, with a third edition to take place in September 2018.[10]

C. Advanced missile and missile-defence technologies

26. Missile technology has civilian and military applications. The engines capable of powering intercontinental ballistic missiles and civilian space launch vehicles are largely indistinguishable. Nonetheless, most of the active technology development described here occurs in the military sphere, although some projects are joint endeavours between defence and civilian research organisations.

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[7] See OPCW document RC-4/DG.1.

[8] Most recently, the InterAcademy Partnership and the Croatian Academy of Sciences and Arts convened an international workshop on the theme "Governance of dual use research in the life sciences: advancing global consensus on research oversight", held in Zagreb in June 2018.

[9] See OPCW document SAB/REP/1/14, available at https://www.opcw.org/fileadmin/OPCW/SAB/en/TWG_Scientific_Advsiory_Group_Final_Report.pdf.

[10] See Spiez CONVERGENCE, report on the first workshop, held from 6 to 9 October 2014, available at https://www.labor-spiez.ch/pdf/de/rue/Spiez_Convergence_2014_web.pdf; Spiez CONVERGENCE, report on the second workshop, 5–8 September 2016, available at https://www.labor-spiez.ch/pdf/en/rue/LaborSpiezConvergence2016_02_FINAL.pdf.

Manoeuvrable re-entry vehicles

27. Manoeuvrable re-entry vehicles are designed to be placed on ballistic missiles with either conventional or nuclear payloads. Their main advantage is that they are more capable of evading missile defences than are their standard counterparts. In theory, they can also be fired at moving targets. Research into manoeuvrable re-entry vehicle technology started in the 1990s and systems with this capability have been deployed since 2010. To be effective, such systems require advanced targeting support, including satellites and radars.

Hypersonic glide vehicles

28. Ballistic missiles typically operate at hypersonic speeds[11] during at least the terminal phase of flight. Some States are seeking to develop missiles with the ability to maintain hypersonic speeds (for several minutes) and to combine this capability with precision, manoeuvrability and, in some cases, range in order to be able to strike targets globally within minutes or hours. Like a manoeuvrable re-entry vehicle, a hypersonic glide vehicle would be launched from a ballistic missile. A hypersonic glide vehicle would, however, separate from its booster much earlier than a manoeuvrable re-entry vehicle, with most of its flight proceeding on a non-ballistic trajectory. Thus, while a manoeuvrable re-entry vehicle may be capable of evading missile defences designed to intercept it in the terminal phase of the missile trajectory, hypersonic glide vehicles could also be capable of evading mid-course missile defences.[12] This is a result not only of their manoeuvrability but also because early warning radars would not be able to detect them until much later than standard ballistic missiles due to their relatively depressed trajectories.

29. Research into these systems began in the 1930s. There remain several technical barriers to achieving a mature weapon design based on hypersonic glide vehicles. These include the need to shield the payload from extreme heat and the inadequate precision of current guidance systems. Official information about the hypersonic glide vehicle programmes of States is scarce, but most experts conclude that, while such systems are not yet deployed, they could be within five years.

Scramjets

30. States are endeavouring to bring scramjet technology to maturity, including as a strategy for achieving the goal of a reusable aircraft capable of sustaining hypersonic speeds. Also called hypersonic cruise missiles, scramjets, like ramjets, are air-breathing: they use oxygen from the atmosphere rather than oxygen carried on board for fuel combustion. This requires that they first be accelerated by a boost vehicle to a speed of around Mach 3.5.[13]

31. The first successful scramjet flight test was conducted in 2004. Most successful flight tests of such systems have lasted only seconds. Remaining technical hurdles to sustained scramjet flight include thermal management and the need for on-board guidance and communications systems capable of operating at extremely high temperatures. While the majority of research in this field is conducted in military

[11] The term "hypersonic" is generally understood to describe speeds above Mach 5. Supersonic refers to speeds between Mach 1 (the speed of sound, 343 metres per second) and Mach 5.

[12] Ballistic missile trajectories can be divided into boost, mid-course and terminal phases. The boost phase is the initial, powered segment of the flight. Mid-course refers to the segment of the flight after the missile's fuel source has burnt out and before atmospheric re-entry. The terminal phase is the final phase of the missile's flight, commencing with re-entry into the atmosphere.

[13] Ramjets, which have existed since the 1940s, slow the air entering the combustion engine to subsonic speeds and operate at speeds of up to Mach 6. In a scramjet, combustion takes place with air moving at supersonic speeds.

settings, academic bodies are also involved and there has been some discussion of possible future civilian aviation applications. Experts believe that scramjets may be fielded within a decade.[14]

32. Traditional jet turbine engines cannot exceed speeds of around Mach 2.5. Previous efforts to test scramjets have therefore relied on single-use missile boosters. One relatively new area of research in this field seeks to develop a hybrid system combining turbine, ramjet and scramjet elements, known as a turbine-based combined cycle engine. Such systems remain in development and have not yet been flight-tested.

Missile defences

33. Missile defence systems have traditionally focused on countering ballistic missiles, which have predictable flight trajectories. Some States are now seeking systems capable of countering cruise missiles. Cruise missiles are more difficult to track than ballistic missiles not only because of their manoeuvrability, but also because of their lower flight profile. One strategy for overcoming this difficulty is the use of elevated sensors. The use of sensors on tethered airships to protect specific high-value targets has been tested in the past for such applications, but is not currently being pursued.

34. Investigation into the possibility of launching multiple interceptors from one missile defence booster is ongoing. Such systems remain in the development phase. These systems would aim to counter intercontinental ballistic missiles mounted with multiple independently targetable re-entry vehicles, as well as decoys.

35. Military forces are investigating the use of directed energy for missile defence applications, including lasers mounted on unmanned aircraft, although no such system has been deployed. Proponents of the strategy argue that such systems could be used for defence against missiles in the boost phase.

36. At least one State has started to look at the possibility of defence against hypersonic glide vehicles, although there is little information available on what form such technology would take, other than incorporating space-based sensors.

Anti-satellite ballistic missiles

37. Terrestrial anti-satellite missiles can involve either the launching of a payload that would intersect with the orbital path of the target satellite at the time of passage and detonate an explosive, or a direct hit with a kinetic impactor. The latter requires more advanced sensor technology.[15] The capabilities relevant to anti-satellite missions have advanced significantly outside dedicated anti-satellite weapons programmes. Some rockets, ballistic missiles and missile defence interceptors can in theory double as anti-satellite weapons. Several missiles have been used to destroy targets in orbit over the past decade.

Relevant intergovernmental processes, bodies and instruments

38. The General Assembly has established three panels of governmental experts on the issue of missiles in all its aspects, which met in 2001–2002, 2004 and 2007–

[14] See, for example, James M. Acton, *Silver Bullet? Asking the Right Questions About Conventional Prompt Global Strike*, p. 55.

[15] A sensor is any natural or artificial instrument that can detect and convey information about a specific property in an environment, such as temperature, light, sound, pressure, force and motion.

2008.[16] Although the issue of missiles remains on the agenda of the First Committee, there has been no resolution on the topic since 2008.[17]

39. There are two intergovernmental regimes concerned with voluntary measures related to missile technology: the Missile Technology Control Regime and The Hague Code of Conduct. The Missile Technology Control Regime was established in 1987 with the aim of limiting the spread of ballistic missiles and other unmanned delivery vehicles capable of delivering weapons of mass destruction. It has 35 members. Under The Hague Code of Conduct, which was adopted in 2002, States make politically binding commitments to exercise maximum restraint in developing, testing and deploying ballistic missiles and to uphold transparency measures regarding policies on, and launches of, ballistic missiles and civilian space vehicles. A total of 138 States subscribe to The Hague Code of Conduct. Hypersonic glide vehicles have not yet been discussed in the meetings of subscribing States to these instruments. Neither of these instruments is directly related to the United Nations, although the General Assembly passes biennial resolutions welcoming The Hague Code of Conduct.[18]

40. The Advisory Board on Disarmament Matters of the Secretary-General considered hypersonic weapons in 2016, recommending further study. The Office for Disarmament Affairs and UNIDIR are cooperating to complete a study on this topic in 2018, with a view to promoting further engagement and exchanges by Member States on the issue.

41. It has been reported that bilateral talks on hypersonic glide vehicles were proposed in 2017 but did not take place. The issue of such weapons was previously raised in bilateral arms reduction talks but was expressly omitted from the limits on missile holdings in the Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms.

42. The issue of terrestrial anti-satellite weapons has been raised in various United Nations bodies concerned with outer space security, including the Conference on Disarmament, the United Nations Disarmament Commission and the First Committee of the General Assembly.

D. Space-based technologies

43. While military and security interests drove early efforts to access and use space, the use of space today covers a broad range of industries of commercial, economic and military significance. Advanced military forces are today entirely dependent on a range of space-based technologies for fundamental tasks such as early warning systems, navigation, surveillance, targeting and communication. Satellites are particularly vulnerable to space negation techniques, including radio electromagnetic interference, spoofing and jamming, and terrestrial anti-satellite hit-to-kill weapons. The present section focuses on recent developments in space-based technologies with possible anti-satellite applications.

On-orbit servicing and active debris removal

44. Robotic on-orbit servicing capabilities are being developed by national civilian and military bodies and commercial satellite companies. This capability relies on a number of component functions, including manoeuvring, close approach, rendezvous, docking and grappling. Applications for such capabilities include satellite refuelling,

[16] See A/57/229, A/61/168, A/63/178.

[17] See resolution 63/55.

[18] Most recently, resolution 71/33.

repair and transportation and, potentially, asteroid mining. Systems capable of such activity in both low Earth orbit and geosynchronous orbit are currently in testing.

45. On-orbit servicing systems are expected to reach their full operational capability in the next two to five years. There is concern that such systems could be used for aggressive acts or that it would be impossible to interpret their purpose directly from their behaviour, particularly given their ability to approach a satellite without its cooperation and in the absence of norms for the responsible use of such systems.

46. There are similar concerns about the related concept of active debris removal. Active debris removal refers to the use of an external system to dispose of space debris (as opposed to post-mission disposal, which refers to an object being designed to remove itself from orbit). Various actors are developing and testing active debris removal systems, exploring a variety of technological pathways. Most involve rendezvousing with a target, capturing it and modifying its trajectory so that it will burn up in the atmosphere. Strategies being explored include the use of small satellites equipped with robotic arms, nets, harpoons and adhesives, as well as the use of a very thin membrane that would wrap around its target. There have also been academic studies on the feasibility of using space-based lasers to destroy relatively small-scale space debris. No such system has yet reached operational capability.

Space-based lasers

47. Space-faring nations are exploring and deploying laser-based communications between satellites. Laser-based communication is less susceptible to conventional jamming techniques than radio communications. The first such system was deployed in November 2016. While these lasers are likely to have much lower power capacities than would be required to damage satellites, their development could contribute to the development of higher-powered space-based lasers. Research is also underway in at least one university into the use of space-based lasers for deflecting asteroids or other objects posing a risk of impacting Earth.

Relevant intergovernmental processes, bodies and instruments

48. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies entered into force in 1967 after consideration by the Committee on the Peaceful Uses of Outer Space and by the General Assembly. The Treaty provides the basic framework for international space law, including prohibiting the placement of nuclear weapons or any other weapons of mass destruction in outer space or the stationing of such weapons on celestial bodies.[19]

49. The prevention of an arms race in outer space has been one of the core issues on the agenda of the Conference on Disarmament for more than two decades. The Conference has considered various proposals under this agenda item, including draft treaties on the prevention of the placement of weapons in outer space and of the threat or use of force against outer space objects. Despite the inability of the Conference to agree upon a programme of work, it has held substantive informal discussions on the prevention of an arms race in outer space in recent years. In February 2018 it decided to establish five subsidiary bodies, including one relating to the agenda item on the prevention of an arms race in outer space.

[19] The other United Nations treaties on outer space are the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space; the Convention on International Liability for Damage Caused by Space Objects, the Convention on Registration of Objects Launched into Outer Space, and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.

50. In 2017 the General Assembly adopted resolution 72/250, co-sponsored by China and the Russian Federation, in which the Assembly established a group of governmental experts to consider and make recommendations on substantial elements of an international legally binding instrument on the prevention of an arms race in outer space, including, inter alia, on the prevention of the placement of weapons in outer space. The group will meet in 2018 and 2019.

51. In its resolution 65/68, the General Assembly requested the Secretary-General to create a group of governmental experts to conduct a study on outer space transparency and confidence-building measures. The Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities met in 2012 and 2013 and agreed upon a report by consensus (A/68/189). In 2018 the United Nations Disarmament Commission agreed to add to its agenda for the 2018–2020 cycle the following item: in accordance with the recommendations contained in the report of the Group of Governmental Experts on Transparency and Confidence-building Measures in Outer Space Activities (A/68/189), preparation of recommendations to promote the practical implementation of transparency and confidence-building measures in outer space activities with the goal of preventing an arms race in outer space.

52. The General Assembly annually adopts a resolution on the prevention of an arms race in outer space, most recently resolution 72/26, and since 2014 it has annually adopted a resolution entitled "No first placement of weapons in outer space", most recently resolution 72/27.

53. The Committee on the Peaceful Uses of Outer Space was established by the General Assembly in 1959 to govern the exploration and use of space for peace, security and development. The Committee has two subsidiary bodies: the Scientific and Technical Subcommittee and the Legal Subcommittee. The Scientific and Technical Subcommittee discusses questions related to the scientific and technical aspects of space activities. Its Working Group on the Long-term Sustainability of Outer Space Activities, established in 2010, has been working to produce agreed guidelines to reduce risks to the long-term sustainability of outer space activities.

54. UNIDIR co-hosts an annual space security conference, providing a forum for States to discuss many of the issues covered in this report.

E. Electromagnetic technologies

55. A variety of the weapon types under development or recently deployed use electromagnetic energy to cause their primary destructive effects. They can be broadly divided into systems that:(a) deny, impede or destroy an adversary's ability to access the electromagnetic spectrum, in a practice that is commonly termed electromagnetic warfare (also referred to as electronic warfare); and (b) destroy a physical target. Railguns, which employ electromagnetic energy to propel a projectile, fall into the latter category. Different types of directed-energy weapons may fall into either or both categories.

56. Many modern weapon systems, in particular manned and unmanned aircraft, and missiles, employ sensors, guidance systems and communications that rely on the electromagnetic spectrum for their operation. Electromagnetic warfare seeks to exploit that reliance through jamming, disturbing, spoofing or hacking, and can employ various means, ranging from radiofrequency weapons to, hypothetically, nuclear electromagnetic pulses. Systems with these capabilities have been in place since at least the 1970s. In general, they are in general much less expensive to use than comparable countermeasures, such as air defence systems. Electromagnetic warfare systems can be mounted on ground vehicles, manned and unmanned aircraft

and ships. In theory, they can also be placed undersea or in space. In addition, militaries use defensive electromagnetic systems to prevent electromagnetic attacks on their systems. Advances in electronics are driving innovations currently being pursued in this area, which include systems that can jam multiple frequencies simultaneously, can target with greater precision and are more difficult to attribute to a given actor. Electromagnetic weapons have the potential to disrupt or disable digital connectivity on a large scale, although attempts are being made to better define certain critical infrastructure against such threats.

57. Directed-energy weapons are a specific subset of electromagnetic warfare systems that, in some cases, could also be employed to have a destructive physical effect. Technological avenues are being pursued in that regard, including high-energy lasers, high-power microwaves, millimetre waves and particle beams. High-energy lasers appear to have the most immediate potential for destructive applications. Laser weapons are attractive to militaries, in particular for air and missile defence applications, due to their precision, speed and low cost per "munition" when compared with traditional alternatives. Beginning in the 1960s, early research into laser weapons was focused on chemical lasers, which were powerful enough to be of utility, but which had prohibitive requirements related to size, weight, power and temperature. In recent decades, advances in solid-state laser technology have at least partially addressed size and weight concerns. In this connection, research into is under way on the possible use of very small fibre lasers in arrays. Militaries are also examining the use of free-electron lasers as direct-energy weapons. At the time of writing, one high-energy laser weapon with kinetic effects is known to be deployed, and many others are known to be undergoing development and testing. Lasers are widely used in civilian sectors.

58. Railguns use electromagnetic energy to fire solid projectiles. Such weapons, which would have ranges of around 200 km or less, could theoretically be capable of launching projectiles at greater speeds than rockets or missiles launched by chemical propellants and would therefore be capable of destroying targets with their kinetic energy alone. The projectiles employed by such systems would be much lighter and less costly than missiles with comparable ranges. Technical barriers to the fielding of railguns include their requirements for a large power supply and for extremely robust components in the launcher and projectiles. Advances in energy storage and the miniaturization of robust electronic circuits have aided the development of viable prototypes. Militaries are understood to be developing railguns primarily for anti-access/area denial and naval defence roles. Experts assess that such weapons may be deployed within five to ten years. Railgun technology has primarily been pursued in a military context.

Relevant intergovernmental processes, bodies and instruments

59. None of the weapons covered in section E of the present report are the subject of specific intergovernmental deliberations. Electromagnetic warfare and directed-energy weapons could come up in the context of deliberations on outer space security (see section D). Some directed-energy weapons may have effects similar to those of blinding laser weapons, as banned in Protocol IV of the Convention on Certain Conventional Weapons, but would likely not be captured by the definition contained therein.

F. Materials technologies

60. Over the past decade, weapons design and production methods have emerged that could have consequences for international efforts to address the illicit trade in small arms, particularly those that could have an impact on weapon marking, record-

keeping and tracing. Non-traditional materials, such as polymers, and modularity in weapons design have the potential to fundamentally alter the way weapons are marked and traced as well as how records are kept.

61. Additive manufacturing, also known as three-dimensional printing, is a family of production technologies that fabricate objects by adding successive layers according to a digital design, called a computer-aided design file. Compared with traditional subtractive production technologies, it is cheaper, can build more complex structures and does not rely on skilled human operators. Additive manufacturing techniques were first developed in the 1980s but their use for military applications is relatively recent. Additive manufacturing has wide-ranging civilian applications.

62. Unlike the other technologies covered in this report, additive manufacturing could not be used as a new type of weapon itself, but rather as a new way of producing and proliferating weapons or weapon components. Computer-aided design files in particular can be transferred or widely disseminated with ease. Additive manufacturing is already being used in the aerospace and defence industries for the production of aircraft and missile components, including engines. States are also studying the use of additive manufacturing to create novel warhead structures. It has also been used to produce complete handguns, including polymer handguns.

63. Nanotechnology refers to the manipulation of objects at a scale of between 1 and 100 nanometres (one nanometre is 10^{-9} m, an order of magnitude larger than an atom). It is a very broad field with numerous potential civilian and military applications. Engineered nanomaterials can have a range of attractive characteristics including increased electrical conductivity, hardness and strength, and reduced weight. Military forces have been actively exploring possible applications for such materials for at least a decade. In addition to applications such as cloaking, camouflage and smart armour, military forces have examined the use of nanomaterials to increase the energy released by explosives. Experts have also expressed concern about the potential for nanotechnology to enhance the delivery of chemical and biological weapons. For example, the delivery of therapeutic drugs could be exploited for the delivery of toxic chemicals, and nanoparticles may have enhanced acute toxicity compared with larger particles.

Relevant intergovernmental processes, bodies and instruments

64. States have considered developments in small arms and light weapons manufacturing, technology and design in the context of the Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects (Programme of Action on Small Arms) and of the International Tracing Instrument. The challenges and opportunities posed by new technologies have been discussed at the technical level in the framework of the International Tracing Instrument since 2011. The first meeting of governmental experts drew the attention of States to the difficulty of durably marking polymer-frame firearms and the challenges posed by modular design. The second meeting of governmental experts in 2015 expanded discussions to encompass additive manufacturing and the potential opportunities offered by new technology for enhanced small arms and light weapons control.

65. Pursuant to a request from States at the 2012 Review Conference on the Programme of Action on Small Arms and the International Tracing Instrument, the Secretary-General submitted a report providing an overview of trends and challenges related to new technology (A/CONF.192/BMS/2014/1). The report addresses materials, design and production techniques as well as new technology applications such as lasers, microstamping, radio frequency identification and barcoding. At the Sixth Biennial Meeting of States to Consider the Implementation of the Programme

of Action on Small Arms, States acknowledged the need to implement the marking, tracing and record-keeping requirements of the International Tracing Instrument regardless of the material and design employed, including additive manufacturing.[20]

66. During consultations on the 2016 comprehensive review of the status of implementation of Security Council resolution 1540 (2004), States discussed the proliferation-enabling aspects of additive manufacturing. The final document on the review noted that the threat of the proliferation of weapons of mass destruction by non-State actors is complicated by rapid advances in science, technology and international commerce.[21]

67. Additive manufacturing will have implications for various export control regimes, including the Missile Technology Control Regime, the Nuclear Suppliers Group and the Wassenaar Arrangement. Additive manufacturing has been discussed within the Missile Technology Control Regime for several years and was formally added to its agenda in 2017.

68. The use of nanotechnology in weaponry is not currently the subject of any specific intergovernmental deliberations. However, since the Third Review Conference of the Chemical Weapons Convention in 2013, the OPCW Scientific Advisory Board has recommended keeping advances in nanotechnology under review and included a review of the field in its recent report to the Fourth Review Conference of the Chemical Weapons Convention.[22]

III. Broader impacts on security and disarmament

69. Each of the scientific and technological developments discussed in the present report have potential military applications and associated consequences for the waging of armed conflicts, and possibly peace and security more broadly, in their own right. Some of the possible consequences have been discussed in the preceding sections. The present section considers, non-exhaustively, the potential challenges for regional and global security posed by the combined effect of these developments.

70. Many of the developments covered in the present report represent manifestations of broader trends, including: increased speed and autonomy in the waging of war and use of force; growing interdependence between the civilian and military realms; the difficulty of controlling the development and spread of certain new technologies; a return to arms-race dynamics in the strategic sphere; and the accelerated pace of technological development and the challenge of ensuring that normative efforts keep pace with such development. As outlined in the report of the Secretary-General entitled "Securing our common future: an agenda for disarmament", those trends lead to an array of new concerns.

71. New weapons technologies could strain existing legal frameworks, including by facilitating the use of force through non-traditional means, such as electromagnetic jamming, and also in ways that are difficult to understand in the light of traditional thresholds for exercising the right of self-defence. Likewise, the increased use of remotely piloted and autonomous systems arguably facilitates the employment of force in contexts in which the applicable legal framework is unclear. Increased autonomy and remote operation, as well as the pursuit of military operations in cyberspace and outer space, could, moreover, create perceptions of casualty-free warfare, potentially lowering political thresholds for the use of force.

[20] A/CONF.192/BMS/2016/2, para. 69.
[21] S/2016/1038, para. 34.
[22] See OPCW document RC-4/DG.1.

72. Many new weapon technologies effectively reduce the decision-making time for users, as well as for opposing forces to respond. This is particularly the case for weapons that travel at high speeds or that are designed to be undetectable. Weapons that combine these characteristics are especially problematic, especially if they involve systems that can be deployed with either nuclear or conventional munitions. Such technologies can have several undesirable implications. They can lead to misunderstanding and unintended or inadvertent escalation. They can limit the ability of human operators to exercise their duty to undertake the necessary precautions to avoid civilian casualties.

73. Undesirable consequences due to reduced decision-making time could be further exacerbated by increased autonomy in weapon systems. Autonomy in complex systems has already been shown to lead to unanticipated, unexplained and uncontrolled outcomes in civilian applications such as commercial aircraft operation. Moreover, the increasing reliance of modern military forces on cybertechnologies and space-based technologies and the difficulty of defending against attacks in these spheres arguably increase incentives for early action.

74. Concerns have been raised regarding complications for attribution associated with many of these developments, which could in some circumstances lead to unwarranted armed responses and escalation. The use of cybertechnologies and remotely controlled technologies has already posed challenges in this regard. For example, there has been an instance of a military force shooting down a civilian unmanned aircraft where it was unclear who the operator was. Artificial intelligence-enabled cyber and artificial intelligence-enabled kinetic attacks will likely pose additional direct challenges regarding attribution.

75. More broadly, the enabling nature of cyberspace means that cyber-enabled critical infrastructure, ranging from the financial sector to power grids and nuclear facilities, are vulnerable to attack because they rely on computer networks to function. The nature of a nuclear facility, for instance, makes it susceptible to compromise through cyber means in multiple ways such as the theft of inventory, the sabotaging of safety, operations and satellite and communications systems, and the compromising of data integrity.

76. Due to a combination of these factors, certain new weapon technologies also have increasing implications for human rights. Some weapons, like armed unmanned aircraft, can enable the use of force in situations outside traditional battlefields and attacks on individuals who are not direct participants in hostilities. Certain uses of enabling technologies by armed forces, such as big data and artificial intelligence in the identification and selection of targets, may raise further concerns in the areas of ethics and privacy.

77. Finally, many share concerns that these technologies could be easily acquired by, or could be used as tools of proliferation by, malicious non-State actors. The combination of additive manufacturing and encrypted or dark web-based communications raises serious proliferation concerns. The increasing digitization of information also presents challenges to traditional approaches to non-proliferation, which are largely based on export and import controls on tangible items. Today, certain proliferation-sensitive information exists in an intangible form and can be passed electronically from country to country, thereby circumventing customs regulations and checks. Malicious actors could seek to exploit unique weaknesses in artificial intelligence-enabled systems, drawing, for example, on research into strategies that are able to fool otherwise well-performing machine vision and speech recognition systems through very simple manipulations. Much cutting-edge research in fields such as synthetic biology and artificial intelligence is conducted by academic and private industry researchers who publish their findings publicly. Ever more

sophisticated remotely-piloted aerial vehicles are readily available commercially, and the widespread availability of such systems with swarming or other autonomous functions is plausible in the short term.

IV. Processes for responding to developments in science and technology with implications for security and disarmament in general

78. Article 36 of the Protocol additional to the Geneva Conventions of 12 August 1949, and relating to the protection of victims of non-international armed conflicts, obliges States to determine, in the study, development, acquisition or adoption of a new weapon, means or method of warfare, whether its use would, in some or all circumstances, be prohibited by international law; these are known as legal weapons reviews. The article does not provide guidance on the characteristics or modalities of these reviews. Only a small number of States is known to have a formal review mechanism in place in accordance with article 36.

79. Five Groups of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security have been established since 2004. The reports of three of these groups have made progress on this issue, including agreeing on the application of international law in the use of information and communications technologies by States; norms, on rules or principles for responsible State behaviour; on measures for confidence-building; and on measures for international cooperation and assistance and capacity-building in the use of information and communications technologies.[23] In 2015 the General Assembly adopted resolution 70/237, in which it called upon Member States to be guided in their use of information and communications technologies by the 2015 report of the Group of Governmental Experts.

80. The Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, as amended on 21 December 2001, is usually referred to as the Convention on Certain Conventional Weapons. The purpose of the Convention is to ban or restrict the use of specific types of weapons that are considered to cause unnecessary or unjustifiable suffering to combatants or to affect civilians indiscriminately. The structure of the Convention on Certain Conventional Weapons — a chapeau Convention and annexed Protocols — was adopted to ensure future flexibility. The Convention itself contains only general provisions. All prohibitions or restrictions on the use of specific weapons or weapon systems are the object of the Protocols annexed to the Convention. This structure means that the Convention can be used as a forum for responding to developments in science and technology of relevance to its purpose, as has been the case for lethal autonomous weapons systems.

81. The Advisory Board on Disarmament Matters was established in 1978. One of its functions is to advise the Secretary-General on matters within the area of arms limitation and disarmament, including on possible studies and research. The Board has considered and made recommendations on a number of scientific and technological developments with possible implications for security and disarmament, including autonomous weapons systems, artificial intelligence, armed unmanned aircraft, the nexus between weapons of mass destruction, cybersecurity and terrorism, and verification technologies.

[23] A/65/201, A/68/98 and A/70/174.

82. In its resolution 2325 (2016), the Security Council called upon States to take into account developments on the evolving nature of risk of proliferation and rapid advances in science and technology in their implementation of resolution 1540 (2004) and requested the 1540 Committee to take note of such developments in its work, where relevant.

V. Beneficial applications for disarmament, non-proliferation and arms control

83. Many of the technologies described in the present report, as well as other new and emerging technologies, may have beneficial applications, including for disarmament, non-proliferation and arms control.[24] Advances in X-ray and neutron radiography could improve the ability of authorities to detect smuggled fissile materials. Advances in sensor technology, including gravity and magnetic anomaly sensors, could improve ground-based and airborne verification techniques. Advances in the life sciences mean that the global ability to detect and treat disease has been enhanced, regardless of whether an outbreak is naturally occurring or the result of a deliberate act. Advanced cryptographic techniques, including ledger technologies, may be applied in weapons tracking and in checking the veracity of data provided for verification purposes.

84. The emergence of new technologies, as well as the novel repurposing of existing technologies, has benefited from increasingly transdisciplinary problem-solving and collaboration across scientific communities. This has produced intriguing technological opportunities for chemical and biological disarmament.[25] The integration of artificial intelligence and communications capabilities with existing methods for the collection of (bio)chemical, spatial, temporal and other data streams is particularly promising in this regard. Sensing equipment carried by unmanned systems, as well as wearable devices capable of collecting physiological signatures, visual images and indicators of chemical change, can detect unexpected or unusual (bio)chemical events in real time through patterns recognized in data streams, as well as through environmental signatures. It has also been demonstrated that image recognition technologies can identify certain characteristics of chemical exposure. Further development of these integrated technologies and training data could significantly enhance early-warning and investigative capabilities, with unmanned sensing systems providing increased safety for inspectors working in potentially hazardous environments.

85. The Comprehensive Nuclear-Test-Ban Treaty is underpinned by a unique science-based verification regime founded on the collection and processing of data from a network of 337 facilities worldwide. Data from the four technologies of the International Monitoring System of the Comprehensive Nuclear-Test-Ban Treaty — seismic, hydroacoustic, infrasound and radionuclide — are used to monitor and detect potential nuclear explosions, thus supplying the international community with reliable, credible and timely information on possible nuclear tests. Regular Science and Technology Conferences are facilitated to promote technology foresight in nuclear test monitoring. Additionally, the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization has organized two Science

[24] It is beyond the scope of the present report to consider the broader possible beneficial applications of the technologies examined.

[25] The OPCW Scientific Advisory Board has considered these opportunities in its review of science and technology. For further reading, see the report of the Scientific Advisory Board's workshop on emerging technologies (SAB-26/WP.1, dated 21 July 2017), available at www.opcw.org/fileadmin/OPCW/SAB/en/sab26wp01_SAB.pdf.

Diplomacy Symposiums with the objective, inter alia, of encouraging cooperation and collaborative research and innovation on nuclear test monitoring science and technology.

VI. Conclusions and recommendations

86. Many of th developments raised in the present report are the subject of active international discussion. Others are not, although forums exist in which such discussions could take place. In their views submitted for the present report, many Member States cautioned against creating new bodies, in order to avoid duplicating or undermining existing bodies and instruments.

87. There is, however, a need for better coordination among the various efforts under way across the United Nations and within Member States to address developments in science and technology, in order to ensure that the international community's efforts in this regard are both coherent and comprehensive. The First Committee of the General Assembly has a sufficiently broad mandate to enhance coordination in this connection, including under its agenda item on the role of science and technology in the context of international security and disarmament. It is hoped that the report will serve as a contribution to that effort.

88. In addition, the Advisory Board on Disarmament Matters has historically played a role in bringing attention to new weapons technologies warranting further multilateral attention and should continue to do so in future. The Board might benefit from a systematization of that aspect of its work, to ensure that its deliberations keep pace with technological developments and that it is able to access relevant expertise in that pursuit.

89. Besides receiving ongoing support from the Office for Disarmament Affairs, the Board's work has frequently received input from UNIDIR, which has recently produced informative studies on some of the above-mentioned issues, including on the autonomization of weapon systems and on artificial intelligence, space security and arm d unmanned aircraft. UNIDIR has also convened experts in various configurations to discuss some science- and technology-related issues with a view to informing and engaging Member States. The Office for Disarmament Affairs and UNIDIR will continue to cooperate in assisting the Board in its work and to build bridges among multilateral practitioners with regard to developments in science and technology and their potential impact on international security and disarmament efforts.

90. The present report demonstrates that many of the developments are occurring within the private sector and in academia, highlighting the need for traditional intergovernmental processes and discussions to better connect with those constituencies. Some of the forums described in the present report, most notably the Biological Weapons Convention and the Convention on Certain Conventional Weapons, could be and are being used to facilitate those connections. In recent months the Conference on Disarmament has made an effort to actively bring technical expertise into the deliberations of its subsidiary bodies. In other cases, the international community have moved in the opposite direction. Given the growing role of science in the implementation of all provisions of international treaties, resolutions and other arrangements, the ability to call upon credible and reliable scientific experts is essential, and ensuring the scientific literacy of all involved in such processes is also important.

91. The recommendations and commitments set out below are made on the basis of the broad observations addressed in the present report.

92. The Advisory Board on Disarmament Matters is requested to maintain vigilance in respect of developments in science and technology relevant to international security and disarmament, including by making recommendations on items warranting further study, as appropriate.

93. In the case of groups of governmental experts with particularly technical mandates, the General Assembly should consider creating attendant groups of scientific experts to support and inform policy deliberations.

94. States should enhance transparency and cooperation with regard to the implementation of their obligations under article 36 of the Protocols additional to the Geneva Conventions of 12 August 1949, and relating to the adoption of an additional distinctive emblem. The Office for Disarmament Affairs in cooperation with UNIDIR will organize an informal process with a view to facilitating the exchange among States of information and experiences relating to the review of new weapons.

95. Member States and United Nations bodies should enhance cooperation with the private sector, non-governmental organizations and academia. To that end, the Office for Disarmament Affairs will facilitate a series of informal discussions, in collaboration with appropriate partners, including UNIDIR, and involving Member States and sectoral experts, in which participants will consider key scientific and technological sectors as well as strategies for mitigating risks and preventing undesired foreseeable impacts on security, in accordance with the Charter of the United Nations.

96. In an effort to contribute to building the capacity of Member States, the United Nations will revitalize and make maximum use of World Science Day for Peace and Development on 10 November, including by holding science diplomacy events to assist diplomats in connecting with relevant scientific expertise. The participation of young people in observance of the day is strongly commended. Young people will undoubtedly bring novel perspectives to these issues.

97. Finally, the Secretary-General will engage and work with scientists, engineers and industry to encourage responsible innovation in science and technology and to ensure they are applied for peaceful purposes, as well as the responsible dissemination of knowledge, in conformity with the principles and objectives of the United Nations.

VII. Replies received from Governments

Austria

[Original: English]
[15 May 2018]

The continuous advances in science and technology increasingly influence everyday life and have the potential to support efforts for international security and disarmament. However, in seeking the benefits of these developments, it is important to be aware of the possible impacts of non-civilian use of emerging technologies, specifically in the areas of artificial intelligence and autonomous systems.

The possible production and use of autonomous weapon systems presents numerous ethical, moral, legal and security-related concerns, which Austria believes

the international community must meet pre-emptively instead of reacting in retrospect to already-existing circumstances.

The ability of autonomous weapon systems to adhere to international humanitarian and human rights law and to uphold the principles of necessity, proportionality and distinction has not been demonstrated. Also, accountability is not possible when decisions are taken by machines. Therefore, Austria maintains its position that there should not be any weapon system that can act independently of meaningful human control, oversight or supervision when applying lethal force. In Austria's view, the development and use of such systems could have regional and global destabilizing effects, could result in a new type of warfare and would lead to an arms race as States try to avoid comparative disadvantages, lower the threshold for the use of force as the human factor is removed from armed conflict and contribute to regional and international instability.

The fact that the concerns raised by the potential development of autonomous weapon systems are being discussed at the level of the Group of Governmental Experts within the Convention on Certain Conventional Weapons speaks to the urgency of the matter. Austria welcomes the fact that positive progress was made at the most recent meeting of the Group in April 2018, as all States affirmed that:

(a) International humanitarian law applies to autonomous weapon systems, thereby preserving the principles of accountability and responsibility;

(b) Effective/meaningful human control has to be retained in every weapon system.

These two very important points indicate that there are restrictions to the means of warfare, which should be spelled out more clearly. Given the complexity, breadth and ever-evolving nature of the topic, however, there are still different interpretations concerning the precise definition of autonomous weapon systems; the exact degree of human control; and critical functions over which human control must be maintained at all times.

Austria considers that these issues could be best clarified in negotiations on a regulatory framework to be introduced, which is needed to provide a clear common understanding. For these reasons, Austria supports the establishment of a legally binding instrument in order to prohibit autonomous weapon systems in which critical functions are not under meaningful and effective human control and proposes to start negotiations on a new protocol under the Convention on Certain Conventional Weapons.

Cuba

[Original: Spanish]
[11 May 2018]

Scientific and technological developments can have both civilian and military applications, and progress in science and technology for civilian applications needs to be maintained and encouraged, while preserving international security.

The products of developments in science and technology can be turned into weapons when they are designed and/or used to inflict damage on the infrastructure of a State.

The hostile use of information and telecommunications technologies, with the overt or covert intention of undermining the legal and political system of a State, is a violation of internationally recognized norms in this field. The international community must avoid and refrain from taking unilateral action that is not consistent

with the purposes and principles of the Charter of the United Nations, the Universal Declaration of Human Rights and international law, such as action aimed at undermining societies or creating situations that could provoke conflict among States.

Access to the information or telecommunications systems of another State should be in line with the international cooperation agreements concluded and should be based on the principle of consent of the State concerned. The nature and scope of exchanges must respect the laws of the State which is granting access.

The imposition of selective and discriminatory restrictions on access to materials, equipment and technology required by less developed countries is a serious impediment to the application of the inalienable right of all States to the development of science and technology, particularly in the nuclear, chemical and biological fields, for peaceful purposes.

Cuba has a body of legislation and procedures which governs all the activities of the various national bodies and institutions whose work relates to the nuclear, chemical and biological fields, making it possible to exercise effective control over the transfer of arms, military equipment and dual-use goods and technology, while ensuring that such legislation, regulations and procedures are consistent with the obligations assumed in the international treaties to which Cuba is a State party, including the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction; the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction; the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects; the Treaty on the Non-Proliferation of Nuclear Weapons; the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco); the Treaty on the Prohibition of Nuclear Weapons and the treaties relating to outer space.

Cuba reiterates that international cooperation is essential to tackle the dangers associated with the misuse of science and technology in the context of international security and disarmament.

India

[Original: English]
[15 May 2018]

Background

General Assembly resolution 72/28 on the role of science and technology in the context of international security and disarmament was adopted by the First Committee at the seventy-second session of the General Assembly, in 2017, and subsequently by the Assembly by consensus. It was led by India and co-sponsored by 18 countries (Angola, Austria, Bangladesh, Bhutan, Brazil, Canada, Croatia, Finland, Germany, Italy, Mauritius, Montenegro, Netherlands, Paraguay, Sierra Leone, Spain, Sweden and Switzerland). In the resolution, the Assembly requested the Secretary-General to submit to the Assembly, at its seventy-third session, a report on current developments in science and technology and their potential impact on international security and disarmament efforts, with an annex containing submissions from Member States giving their views on the matter. The views of India are contained in the present submission.

Introduction

Science-and-technology dynamism is a defining feature of the twenty-first century. New technology fields are emerging and existing fields are coming together in new ways. The number of international actors participating in technology development has also expanded and the relative weight of Governments, the private sector and institutions in research and development has begun to shift. Importantly, a number of developing countries are leveraging technology, especially digital technologies, to accelerate economic development. In "big science", collaborations across borders are becoming more prominent in view of the financial and human resources required, which are often beyond the pale of individual countries. The science-and-technology component in the work of several international organizations, say in the area of climate change or nuclear safeguards, has also risen in salience.

Science and technology has transformed our world and brought us unprecedented economic growth, food security and ease of communication and travel. Scientific and technological endeavours have also erased many of the world's divides and given the international community, especially the youth, common aspirations and a common vocabulary. The potential of science and technology in resolving the world's most intractable problems such as clean and affordable energy is immense, and science can help the United Nations system make progress on the 2030 Agenda for Sustainable Development and the Sustainable Development Goals.

Areas of potential concern and benefit in the context of international security and disarmament

At the same time, there are concerns related to emerging technologies, which could potentially impact long-standing issues on the global disarmament and international security agenda. This has been recognized by various multilateral forums. For instance, the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons has been examining relevant developments in the domain of chemical disarmament. In the context of the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons Convention and on Their Destruction (Biological Weapons Convention), the recently adopted intersessional programme of work includes a meeting of experts on the review of developments in the field of science and technology related to the Convention. Potential benefits and risks of new technologies such as synthetic biology, genome editing and clustered regularly interspaced short palindromic repeats/Cas9 could thus be discussed in an institutionalized manner, with a view to enhancing the national implementation of the obligations contained in the convention, as well as international cooperation to promote and implement the convention, such as through model codes of conduct and biosecurity education. A discussion about emerging technologies is currently under way in the Group of Governmental Experts on lethal autonomous weapon systems of the High Contracting Parties to the Convention on Certain Conventional Weapons. The Conference on Disarmament recently established a subsidiary body to examine emerging issues in the context of its mandate as the world's single multilateral disarmament negotiating forum.

There are potential benefits of emerging technologies, such as enhancing the efficacy and cost-effectiveness of verification measures. In this regard, the potential of technologies, such as distributed ledger technologies, to enhance the implementation of International Atomic Energy Agency (IAEA) safeguards and protect sensitive information remains to be explored.

Many areas of potential concern and/or benefit are emerging from a collapse of boundaries between traditional fields in science and technology and the novel uses of

existing and emerging technologies. Examples include the convergence of chemistry and biology and the potential application of artificial intelligence and autonomous technologies in conventional weapons. A series of sessions of the Group of Governmental Experts on Developments in the Field of Information and Communications in the Context of International Security have been held to look at areas of concern with regard to the offensive use of cyber-tools by both State and non-State actors. Ongoing discussions on space security have now to contend, inter alia, with new technological developments that blur the distinction between outer-space and near-earth domains, as well as with the growing role of private industry in space activity.

Some of the cross-cutting concerns related to emerging technologies include the potential for their misuse by terrorists, proliferation including that of weapons of mass destruction and their delivery vehicles, the risk of arms races and instability and possible incompatibility with existing international law, in particular international humanitarian law, as well as ethical concerns such as the violation of human dignity and the loss of human control.

Role of multilateral forums, involvement of relevant stakeholders

As some of the above examples illustrate, the impact of developments in science and technology is in fact already being addressed in various forums across the United Nations system, even though it may not always be done in a regular or comprehensive manner. Again, industry, academia and other stakeholders have been associated with these discussions, but that has not always been the case. Some issues, particularly those of a sensitive nature, are handled primarily in intergovernmental forums and/or technology regimes. Some of these are even outside the scope of the United Nations.

It is important not to duplicate work that is being done in forums and/or regimes under their existing mandates. The focus should be primarily on working within existing treaty-based frameworks, such as the Chemical Weapons Convention, the Biological Weapons Convention and the Convention on Certain Conventional Weapons, as well as within agencies and institutions, such as IAEA, the Committee on the Peaceful Uses of Outer Space and groups of governmental experts established by the General Assembly. The disarmament machinery, including the First Committee of the General Assembly, the Disarmament Commission and the Conference on Disarmament, can play an important role in addressing gaps and developing a cross-cutting understanding of the impact of science and technology. The Advisory Board on Disarmament Matters as well as the United Nations Institute for Disarmament Research (UNIDIR) could also continue considering these issues as part of their mandates. It would be particularly useful to draw together discussions being held in different forums when they are complementary in nature.

Well-designed multilateral processes can play a vital role in raising awareness of science-and-technology developments, building up expertise and ensuring an interface with industry and academia whose work is interlinked with and can be impacted by the decisions taken by Governments in such forums. While there is no immediate need for new forums, it would be beneficial to enhance the adequacy and efficacy of existing mechanisms that deal with science-and-technology issues. Rapidly evolving technologies developed in the national and industrial domains are not easily susceptible to governance on an intergovernmental plane. An agile and tiered governance approach that respects national and industry prerogatives and priorities might be more suited to these new technologies.

Conclusion

It is the view of India that this process of eliciting and compiling national reflections on the impact of science and technology on international security and disarmament would lead to a more active engagement by Member States on the issue. Equally, it is the hope of India that the report of the Secretary-General would trigger a fruitful and constructive exchange of views among Member States on some of the following themes:

- Surveying and mapping current science-and-technology developments in emerging areas, such as information & communication technology, biotechnology, including synthetic biology and genetics, artificial intelligence, autonomous systems, geo-engineering, distributed ledger technology, outer space, directed energy systems, new materials and additive manufacturing. The focus should be on, in particular, twenty-first century technologies that enjoy growing civilian applications and could be repurposed for military uses.
- Exploring challenges and areas of concern related to the use of such technologies for military purposes. The potential application of such technologies for enhancing assurance levels and confidence-building as well as for lowering the costs of verification of disarmament and arms control agreements could be assessed.
- Seizing potential opportunities, including those related to operational aspects of science and technology in the areas of international security and disarmament as well as counter-terrorism, demining, tracing and disarmament, demobilization and reintegration.
- Building partnerships with industry, academia and civil society.
- Exploring options for the governance of science and technology, which need not be through legally-binding instruments alone; soft law options and multi-tiered governance/distributed-governance options could also be examined.

Measures for follow-up by Member States as well as by the United Nations Secretariat could emerge through such an exercise. The General Assembly and its First Committee, including through the resolution in which the present report is mandated, could continue to be used as a platform for an informed debate, as well as to build consensus on potential challenges and risks and the approaches required to promote international cooperation to address them.

Japan

[Original: English]
[15 May 2018]

Today, the world is witnessing the rapid pace of scientific advancement in fields such as artificial intelligence, robotics, autonomous systems, information technology, life science, nanotechnology and material science, as well as the extensive global diffusion of such knowledge and technologies both in tangible and intangible forms. Japan welcomes the adoption of General Assembly resolution 72/28 on the role of science and technology in the context of international security and disarmament and expects that the initiative will deepen the international community's understanding of this novel, multifaceted, complex, globalized and thus important topic.

At the same time, the deliberations on this topic are in an early stage and their scope is inherently wide. The significance of this issue is acknowledged by all, but it contains diverse aspects that require further study. To that end, the following should be taken into consideration:

- A structured analysis and evaluation of the current state of emerging technologies and possible impacts in the area of international security and disarmament are necessary so that areas can be identified where concerted international action is necessary, urgent and effective.

- The potential misuse or malicious use of emerging dual-use technologies is one of the key cross-cutting issues related to this topic. A special focus must be placed on tackling this threat, while taking care not to hinder the healthy advancement of science and technology.

- It is useful to draw lessons and best practices from the ongoing discussions under existing frameworks, such as the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Convention on Certain Conventional Weapons), the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons Convention and on Their Destruction (Biological Weapons Convention), the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (Chemical Weapons Convention) and the other export-control regimes. In the meantime, it is also important to avoid launching new initiatives in duplication of existing or already-proposed ones, such as discussions on cybersecurity.

- Given the rapid pace of change, it is essential and useful to have input from related stakeholders, particularly from the private sector. In this regard, Japan held, in cooperation with the Stimson Center, the eighth meeting of the Turtle Bay security round table in New York on 23 March 2018 under the theme "Managing the frontiers of technology". At the meeting, experts from States Members of the United Nations, subsidiary organs of the Security Council, think tanks, industry and academia discussed the implications of evolving technologies for international security, and the Secretary-General emphasized the need to maximize the benefits of the technological revolution while mitigating and preventing dangers. Japan is determined to continue this kind of discussion, engaging multiple stakeholders to learn from one another.

- Education and awareness-raising is a key component of scientific training early in the career progression of scientists, helping them to grapple with the possible misuse of technology.

- Capacity-building and the establishment of related technologies for detecting and verifying new types of threats, such as biological and chemical agents, are important.

- The transfer of sensitive items and technology that could contribute to weapons of mass destruction or conventional arms and thus have impacts on international security, disarmament and non-proliferation should be controlled in accordance with the guidelines of export-control regimes (the Nuclear Suppliers Group, the Missile Technology Control Regime, the Australia Group and the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies) and related Security Council resolutions, including resolution 1540 (2004).

- A multi-stakeholder approach should be taken, and close collaboration among policymakers, industry, academia and civil society is necessary.

- An inter-disciplinary approach is needed because the advancement of science creates a number of interlinkages, including between cybersecurity and artificial-intelligence discussions.

- Consistency with existing legal norms and frameworks should be taken into consideration.

Jordan

[Original: Arabic]
[15 May 2018]

Science and technology are essential to our daily lives. They promote the growth and development of local communities in numerous aspects — socially, culturally and economically. They have numerous implications for individuals within their societies and for their interaction with the wider world.

The remarkably rapid pace of progress in technology makes it vulnerable to risks and challenges. Those risks must be addressed through both technological and legal means with a view to finding effective and practical solutions that reduce risks and avert potentially catastrophic consequences.

The Hashemite Kingdom of Jordan plays an active and influential role in promoting security and peace at the national, regional and international levels through the development and use of technology in the following areas:

(a) Monitoring and surveillance;

(b) Preventing smuggling and infiltration;

(c) Stopping attempts by terrorists to cross borders;

(d) Monitoring exports and transit trade that might involve precursors for weapons of mass destruction or dual-use materials, in compliance with Security Council resolution 1540 (2004) and with international conventions and initiatives.

The Kingdom expresses its concern about scientific and technological applications in the military sphere that could give rise to the development of advanced weapons systems, and in particular weapons of mass destruction. It is also concerned about certain conventional weapons, and automated weapons of the future that could operate without any human supervision or control.

We stress that we consider outer space to be the common property and joint patrimony of humanity. Any effort to legislate and regulate the uses of outer space must seek to promote the use of outer space for the benefit of all States — with a commitment to keeping it free of conflict, wars and weapons — and should promote technology exchange and capacity-building for developing States.

Lebanon

[Original: Arabic]
[15 May 2018]

The Army Command wishes to draw attention to the following:

Scientific and technological development contributes to the improvement of border surveillance and border control to prevent the weapons smuggling and to track armed groups.

Promoting science and eliminating underdevelopment in society can put an end to the tendency among young people to turn to extremism and weapons, which is largely caused by ignorance.

The General Command supports all efforts and means towards disarmament and the strengthening of domestic, regional and international security. It has taken

numerous measures towards that end, and has eliminated several armed groups from Lebanese territory in recent years.

It takes care to educate its soldiers in all areas, and especially in the above subject.

With a view to making use of scientific and technological progress for military objectives, it has signed a number of agreements and memorandums of understanding with a number of domestic and foreign educational institutions and cultural associations.

Madagascar

[Original: French]
[15 May 2018]

The United Nations General Assembly has called on all Member States to report on current developments in science and technology and their potential impact on international security and disarmament efforts, giving their views on the matter.

Montenegro

[Original: English]
[15 May 2018]

The Ministry of Defence and the Armed Forces of Montenegro use certain scientific achievements and, primarily, information and communication technologies that have a purpose and role in the field of improving both national and international security and, to a lesser extent, in the processes of disarmament and arms control policies. The scientific achievements and technologies used are developed in other countries and implemented within joint projects or security systems. The most important ones are the educational and simulation centre within the Geographical Information Processing for Environmental Pollution-Related Security with Urban Scale Environments scientific research project of the North Atlantic Treaty Organization (NATO), the information and communication network protected by NATO, Communications Network of the Organization for Security and Cooperation in Europe (OSCE), the information and communication technology core programme and the independent main information and communication network, the Communication and Information System of the Maritime Information Management System technologies for data exchange on maritime traffic in the Virtual Regional Maritime Traffic Centre and the Trans-Regional Maritime Network, the Air Situation Data Exchange programme and the cooperation of the countries of the Adriatic-Ionian region in the use of alternative fuels.

The current status and implementation of mentioned technologies, scientific projects or achievements is as follows:

Geographical Information Processing for Environmental Pollution-Related Security with Urban Scale Environments

The educational and simulation centre, opened at the Golubovci Airbase under the NATO Geographical Information Processing for Environmental Pollution-Related Security within Urban Scale Environments scientific research project in 2014, is a project for environmental protection that is designed to simulate incidents that arise in a situation of uncontrolled emissions of airborne pollutants that may pose catastrophic consequences. The project is funded under the NATO Science for Peace and Security Programme.

The results of the research project are new technological solutions and products and new or improved existing mathematical and computer models for simulating the dispersion of toxic gases in real atmospheric and spatial conditions. The educational and simulation centre has the ability to monitor and process information in the event of air pollution detection in the territory of Podgorica, the capital of Montenegro. A laboratory for the development of hardware and software in this field is also in operation. Having such a centre significantly contributes to the development and better communication of professional and educational scientific resources at the local, regional and global levels.

Information and communication network protected by the North Atlantic Treaty Organization

In the course of 2017, an information and communication network protected by the NATO was established in Montenegro within the Ministry of Defence, the Navy and the Air Force of Armed Forces of Montenegro. . This is how a secure transmission and exchange of various kinds of information (speech, data, e-mail, chats, etc.) is provided between NATO and the aforementioned institutions in Montenegro, in particular the information and communication support of the Armed Forces in NATO and other international missions and operations.

Communications Network of the Organization for Security and Cooperation in Europe

In 2007, Montenegro established the end user station of the OSCE Communications Network, operating since 1991, with the objective of connecting the participating States and the OSCE secretariat through the central server. The purpose of the OSCE Communications Network is to complete diplomatic channels in providing information related to the provisions of the following international agreements:

- Vienna Document 2011 on confidence- and security-building measures
- Treaty on Conventional Armed Forces in Europe
- Treaty on Open Skies
- Agreement on Subregional Arms Control based on the framework established by Article IV of the Dayton Peace Accords

Information and communication technology core programme and an independent main information and communication network

In 2017, the information and communication technology core programme was established in the Ministry of Defence and the Armed Forces of Montenegro in which all critical information and communication services of the Ministry and Armed Forces were implemented. Within the programme, an independent main information and communication network was established, providing all users from the Ministry and Armed Forces with a secure connection to the programme and with the use of information and communication services.

The independent main information and communication network is based on the principle of the wide-area-network (WAN), metropolitan-area-network (MAN) and local-area-network (LAN) technologies:

- The WAN is a digital radio relay (microwave) network of high capacity that is used to connect all prospective Ministry of Defence and Armed Forces locations to the information and communication technology core programme. It is

configured on a ring topology that increases system redundancy and resistance to interruptions.

- The MAN is an optical cable network that is implemented in the prospective barracks and locations of the Ministry and Armed Forces and that provides MAN connection to WAN.
- The LAN is a local cable network that is implemented in the prospective Ministry and Armed Forces facilities and that provides LAN connection to MAN.

A closed information and communication network (Intranet) of the Ministry and Armed Forces is operating through the independent main information and communication network, providing reliable transmission and exchange of information among the users in the Ministry and Armed Forces. Also, the electronic document management system and an email system of the Ministry and Armed Forces is operational.

Navy communication and information system of the Maritime Information Management System of the Armed Forces, Virtual Regional Maritime Traffic Centre and Trans-Regional Maritime Network

With regard to sea surveillance, the Navy of Montenegro uses a new, modern command-and-information system, the maritime information management system, to ensure the sovereignty of Montenegro at sea. It was acquired through a strategic partnership with the United States of America and has been operational since 2013. The system is built on a modular principle and automatically collects data from stationary naval sensors (radar and automatic identification system), and from global data exchange networks on facilities at sea, namely, the Maritime Safety and Security Information System and Lloyd List Intelligence databases, and then correlates, processes, visualizes and further distributes the data in real time. The system provides all the necessary functions of modern naval command-and-information systems necessary for assistance in decision-making and commanding. The system creates and manages a recognized maritime picture for the needs of the defence system, for inter-authority work and coordination and for the exchange of data with neighbours and partners.

The data exchange is carried out at the regional level, within the framework of the Adriatic and Ionian Initiative, based on the agreement on the Virtual Regional Maritime Traffic Centre within the information and communication system and the Trans-Regional Maritime Network. Automatic identification system base stations at coastal radar observation stations enable the transmission of maritime traffic data to the NATO Naval Command Centre in Naples and to the Maritime Safety and Security Information System.

The Virtual Regional Maritime Traffic Centre is a special maritime surveillance system developed by the Italian Navy and presented in 2004 in order to increase the safety and control of maritime traffic in the Adriatic Sea. The purpose of the Centre is to exchange information, among navies, Virtual Regional Maritime Traffic Centre member States and the Centre itself, on the maritime traffic of ships with a gross registered tonnage capacity in excess of 300 in the Mediterranean and Black Sea areas. Navies of the participating countries exchange information, without obligations imposed by international law, in accordance with their regulations and with a view to safeguarding their own security. The navies of all of the countries in the Mediterranean, the Black Sea and the wider community of the Mediterranean participate in the Virtual Regional Maritime Traffic Centre.

In 2009, taking into account that the navies of India, Singapore and Brazil succeeded in developing their own regional maritime transport centres, and considering their compatibility with the Virtual Regional Maritime Traffic Centre, an even wider network was established outside the Mediterranean and Black Sea regions, called the Trans-Regional Maritime Network. Montenegro joined the Virtual Regional Maritime Traffic Centre and the Trans-Regional Maritime Network on 7 October 2009.

Air Situation Data Exchange programme

The Air Situation Data Exchange programme and/or an air traffic data exchange programme was implemented in the Air Operational Centre as part of the preparation for developing minimum operational standards for NATO Integrated Air and Missile Defence System. The system provides links for data exchange with NATO countries in the region and with the NATO command structure centres.

Cooperation of the countries of the Adriatic and Ionian region in the use of alternative fuels

In September 2017, six countries from the Adriatic and Ionian region (Albania, Croatia, Greece, Italy, Montenegro and Slovenia) signed a statement of cooperation in the area of future cooperation in the exploration and use of alternative fuels as the basic means of propulsion for warships. This cooperation is being realized within the Adriatic and Ionian Initiative, namely, the regional security initiatives and cooperation of naval forces of the six countries.

This cooperation is designed to recognize potentially significant benefits in the use of alternative fuels rather than biodiesel or chemical compounds of methyl alcohols (fatty acid methyl esters), as these are less suitable for use on warships, in the interest of:

(a) Better contributing to reducing the effects of climate change;

(b) Improving national security in relation to fuel imports by supplying energy;

(c) Reducing national energy costs;

(d) Increasing the security of the energy supply and influencing the price of the same.

By signing the statement of cooperation, the navies participating in the Adriatic and Ionian Initiative will be obliged to research data-sharing, the development and implementation of technologies and the use of alternative fuels derived from renewable energy sources (green diesel or a mixture of fuels containing a percentage of synthetic biodiesel) on warships. Cooperation will be accomplished through expert consultations, research projects, experimental fuel use, testing and the evaluation and certification of use, as well as through continuous dialogue and exchange of information in this scientific field, aimed at the future development and modernization of warships.

Since the Armed Forces of Montenegro do not possess chemical, biological or nuclear weapons or conventional weapons, the application of which can cause enormous or indiscriminate casualties or harmful effects, there is no need for development, scientific research or the procurement of technologies used in this field. General scientific achievements or technologies are used in the field of disarmament and related technological processes, as well as in the fields of safeguarding, storage, destruction, arms control and military equipment, the application of which is laid

down in internal instructions (guidance on warehouse operations and the instructions for disposal of lethal means).

Netherlands

[Original: English]
[15 May 2018]

Introduction

The Netherlands hereby presents its national view on science and technology and their potential impact on international security and disarmament efforts. To remain concise, the present view is limited in content and time. Timewise, it is confined to the next five years. This period is foreseeable, offering a realistic and meaningful glimpse into the future. With regard to content, the present view is focused on possible threats as well as solutions thereto. This is most relevant in the context of international security and disarmament. Herein, the Netherlands, in its national view, highlights threats related to developments in: (a) cyberspace; (b) artificial intelligence; (c) convergence of chemistry and biology; and (d) genome editing.

Before elaborating on the possible threats emanating from these developments, it is important to underline that the quelling of these threats should stem from existing international law. Guided by the purposes and principles as maintained under article 1.1 of the Charter of the United Nations, the most relevant sources include the Chemical Weapons Convention and the Biological Weapons Convention and overarching (customary) international humanitarian law (and obligations such as distinction and proportionality, in particular, as stipulated by articles 48, 51(2), 51(5)(b) and 57(2)(a)(iii) of Additional Protocol I).

Cyberspace

Cyberoperations are attractive because of the large potential impact that can be realized through relatively limited resources. In many cases, perpetrators of malicious cyber-operations have a certain degree of plausible deniability.

These specific characteristics of cyberspace create the risk of a proliferation of offensive cybercapacities and low barriers for their actual use. This, in turn, creates additional risks and has a potential destabilizing effect on international relations. It may also impair the open, free and secure nature of the Internet, with detrimental consequences for the economic opportunities offered by digitization.

Technological change can also lead to an increase in attack surface. The rapid development of the make-up of devices containing vulnerabilities that are currently not patched through security updates is a case in point. An even greater potential risk, especially in terms of its potential impact, is the risk of nuclear command-and-control systems being compromised.

The impact of all the aforementioned risks would be even more pronounced if the current consensus on applying existing international law to cyberspace and on supplementary voluntary non-binding norms on responsible state behaviour is not sufficiently strengthened.

Artificial intelligence

Artificial intelligence is a collection of present and (near) future technologies with the potential to profoundly influence human civilization. It is expected to further change the roles of and relationship between man and machine. This presents both opportunities and risks. The overarching risk-related question is: how will humans

continue to exercise meaningful human control over advanced systems with artificial intelligence? This applies not only to autonomous weapon systems — much debated since 2013 — but also to artificial intelligence in transportation, finance and business, health care, the judicial system and many other areas.

The answer to this question is not simple and it depends on many different factors. A thorough and deepened debate about meaningful human control is therefore necessary in all domains where artificial intelligence is applied. That debate and forthcoming solutions should not be limited to the operational phase of artificial intelligence systems, but should already incorporate the design, development and testing phases.

Convergence of chemistry and biology

Increasingly, chemicals are being produced using biologically mediated processes, for example, microbial fermentation or enzymes acting as catalysts. Key enabling technologies have resulted in a rapidly expanding capability to redesign or manipulate organisms for specific purposes and in the ability to design and engineer improved enzymes. Although there are concerns that biotechnology could be applied to the production of new chemical weapons, the Temporary Working Group of the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons assessed in 2014 that potential applications to scheduled chemicals were limited at that time. Creating new biological processes will continue to require a considerable investment of capital, resources and time, and these considerations could limit the use of such methods for the large-scale production of chemicals of concern. However, biomediated processes might still be effective for producing weaponizable quantities of toxins that are lethal to adult humans in microgram or lower dosage.

The ongoing convergence of chemistry and biology presents challenges for the Chemical Weapons Convention and the Biological Weapons Convention. It raises issues that are of central relevance to both treaties and that might prompt the question: which convention is best suited to cover a new substance? Thus far, this question has remained hypothetical. Nevertheless, it is a relevant issue that requires further attention. In answering this question, the response that best addresses the potential threat should be the response of choice.

Genome editing

A frequently raised point from a policy perspective as well as a scientific perspective is that advanced biotechnological techniques can pose a threat because the required knowledge and equipment for targeted applications have become increasingly accessible in recent years. "The threshold has been lowered" is a common qualification of this development. Advanced techniques in the field of biological engineering can indeed lead to applications that could pose a threat to society. However, a physical attack using a complex modified organism or products derived therefrom is currently unlikely, given that it requires very distinctive knowledge, extensive experience and advanced laboratory facilities.

At the present time and within the five-year time frame addressed by the present national view, the likelihood of an attack using a biological weapon, whether employing naturally occurring biological agents or obtained through classical biotechnology, is greater than that of a biological weapon attack employing biological agents obtained through the new techniques discussed in the present report.

Considering the expected development of genome editing and current threats posed by biological agents that are not the product of genome editing from the perspective of international security and disarmament efforts, the full and effective implementation of the current biological weapons regime, including the Biological

Weapons Convention, Security Council resolution 1540 (2004) and, in a national context, export controls, is key.

Conclusion

Groundbreaking developments with regard to genome editing and the convergence of chemistry and biology are not expected within the next five years. Notwithstanding, developments in both these areas have the potential to create threats to international security in the future. In the field of cyberspace, current developments are creating great challenges. In all three areas, adhering to and strengthening the existing disarmament and arms control frameworks are key in addressing current and future threats to international security and challenges to the frameworks themselves. This also applies to developments in the field of artificial intelligence. In addition, a thorough discussion about human control is of the utmost importance in fields where artificial intelligence is applied. It is the view of the Netherlands that existing international law should remain the basis for efforts in all these fields.

Oman

[Original: Arabic]
[16 April 2018]

At the present time, it is clear that science and technology are hallmarks of the modern age that play a major role in the formulation of State policy. Science and technology have become dependent on vast institutional systems designed to harness the capacities and creativity of scientists to respond to the needs of development in various areas. The most important of those fields are weapons technology and the military industries of the future, which will without a doubt have an impact on the international security situation and the arms race.

It is the policy of the Sultanate to support the efforts of the international community to regulate, manage and control the use of science and technology in military industries, arms development, and the development of weapons of mass destruction and other lethal weapons that could undermine international peace and security and create tensions in international relations. That calls for monitoring scientific and technological developments, in particular those with potential military applications, and assessing the potential system-wide impacts of new developments.

The competent officials from the Ministry of Foreign Affairs are expected to follow up conventions and treaties relevant to this matter that would limit such developments, in accordance with the policy of the Sultanate in that regard. A number of such agreements have been signed. They include the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction, the Treaty on the Non-Proliferation of Nuclear Weapons, the Comprehensive Nuclear-Test-Ban Treaty, and the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction. On the other hand, one must take into account the legitimate right of States to use technology intended for civilian purposes and weapons that do not have an impact on international peace and security, in accordance with instructions from the highest level in that regard.

Panama

[Original: Spanish]
[14 May 2018]

We are writing to communicate the measures adopted to promote the objectives envisaged in General Assembly resolution 72/47 on the observance of environmental norms in the drafting and implementation of agreements on disarmament and arms control; and in General Assembly resolution 72/28 on the role of science and technology in the context of international security and disarmament.

With regard to environmental norms, we can report that areas contaminated with war materiel were conveyed to the Ministry of Environment for use, safekeeping and administration, through an inter-agency agreement on technical cooperation and allocation whereby the Ministry of Economy and Finance, on behalf of the nation, transferred approximately 55,195.56 hectares containing protected areas, deferred use areas (firing ranges and areas contaminated with war materiel), rural production areas (for forestry development and agroforestry) and rural production areas with conservation forests, located in the sectors to the east and west of the Panama Canal.

In the projects which were executed in areas contaminated by unexploded ordnance, the Ministry of Environment requested the clean-up of the range, for which the plan for rescue and relocation of forest wildlife had to be carried out, in accordance with Resolution AG-0292 of 14 April 2008, before submitting the environmental impact study and the relevant workplan for environmental and industrial safety, health and hygiene.

The Panama National Police plays a fundamental role in disarmament. Therefore, the Secretary-General of the Central American Integration System offered training to experts in explosives and disarmament in order to analyse and make recommendations to the Central American Security Commission concerning the technical viability and operational relevance of the technical guidelines for the planning and implementation of the measures and activities contained in the Code of Conduct of the Central American States on the Transfer of Weapons, Ammunition, Explosives and Other Related Materials; the technical guidelines for marking the origin of firearms and ammunition for use by civilians, the police force and the military; and the legal framework governing international disarmament, weapons control and security agreements.

These legal measures and norms have allowed our national security institutions to care for our environment and maintain control in areas contaminated by war materiel.

Philippines

[Original: English]
[9 May 2018]

The Philippines, through the Department of Science and Technology, sees the need to promote policies that would regulate science and technology initiatives, in particular on technology transfer, to maintain peace and ensure security among Member States. It is essential to strengthen collaboration in the areas of science, technology and innovation, specifically on issues concerning human security and climate change adaptation and mitigation. In this regard, a strong legal framework for the use of technologies that may have an impact on peace and security should be promoted and adopted.

Singapore

[Original: English]
[15 May 2018]

Significant advances in science and technology have had profound implications for our societies. On the one hand, these advances have facilitated an improved quality of life and have immense potential to contribute to the realization of the 2030 Agenda for Sustainable Development. However, while the advances could accelerate human progress, greater reliance on such technologies introduces new vulnerabilities and threats, some of which could have a grave impact on international peace and security. Singapore appreciates the opportunity to submit views on current developments in science and technology and their potential impact on international security and disarmament efforts. Singapore's submission focuses on cybersecurity and outer space.

Information and communications technologies

As a small and highly networked State, Singapore strongly believes in the need for a rules-based cyberspace, underpinned by international law, that could enable economic progress and better living standards both regionally and internationally. Singapore also recognizes that norms governing responsible state behaviour in cyberspace need to be complemented with targeted cybersecurity capacity-building and confidence-building measures, so that countries are able to meet their obligations under those norms. Singapore has been an active participant in key international and regional platforms facilitating discussions on cyber-norms and capacity-building and confidence-building measures.

Singapore has participated in the Global Forum on Cyber Expertise, the Global Commission on the Stability of Cyberspace and the Global Conference on Cyber Space. Singapore also hosted a forum of small States dialogue on the theme "Small States and cybersecurity" and organized two United Nations side events that were focused on developments in cyber-norms discussions at the international level and where participants discussed practical ways to move forward.

Over the past two years, Singapore has worked to raise awareness in the Association of Southeast Asian Nations (ASEAN) through workshops held under the auspices of its ASEAN Cyber Capacity Programme, focusing on norms of responsible State behaviour in cyberspace, how international law applies to cyberspace, strategy and legislation development, critical information infrastructure protection and incident response. Singapore has also convened the ASEAN Computer Emergency Response Team Incident Drill for the past 13 years.

In September 2017, Singapore hosted the second Singapore International Cyber Week, which included the second ASEAN Ministerial Conference on Cybersecurity. During the Conference, ASEAN Ministers recognized the need to move forward on the adoption of voluntary norms of behaviour in ASEAN to guide the responsible use of information and communications technology, using as a reference the recommendations in the 2015 report of the Group of Governmental Experts on Developments in the Field of Information and Telecommunications in the Context of International Security (A/70/174). Most recently, at the thirty-second ASEAN Summit in Singapore in April 2018, ASEAN leaders adopted a statement on cybersecurity cooperation, which tasks relevant ministers with making concrete progress and recommendations on the issue of practical, voluntary norms of State behaviour in cyberspace and feasible options for coordinating ASEAN cybersecurity efforts. Singapore will continue to build on these efforts and will host the third

Singapore International Cyber Week from 18 to 20 September 2018 on the theme "Forging a trusted and open cyberspace".

Outer space

Outer space has become relevant to a broad spectrum of human activities, including navigation, commerce and communications. Singapore firmly believes that outer space should remain a peaceful global commons and is committed to the endeavour of preventing an arms race in outer space. The international community must work together and build on international norms in space, taking into account advancements in space technology and applications thereof since the time most existing treaties on outer space were drafted.

Singapore supports building on the transparency and confidence-building measures in outer space activities contained in the report of the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities (A/68/189). Singapore supported the establishment of a group of governmental experts to make recommendations on substantial elements of an international legally binding instrument for the prevention of an arms race in outer space, including for the prevention of the placement of weapons in outer space. The mandate of the Group should be broad to consider all existing discussions on the peaceful uses of outer space. The Group should work in an open and inclusive manner and take into account the differing views of all countries when making its recommendations. Singapore looks forward to the outcome of the discussions of the Group.

Switzerland

[Original: English]
[15 May 2018]

Summary

In the light of the breathtaking pace of innovation and development, Switzerland has repeatedly emphasized the need to consider new developments in science and technology and their implications for international security and disarmament efforts on a multilateral level. Science and technology offer a great number of opportunities, for instance in view of facilitating the achievement of certain Sustainable Development Goals. Science and technology may also have negative impacts, particularly in the field of international security, where advances may result in the development of new weapons, means and methods of warfare. In this context, science and technology may lead to new arms control challenges, since certain discoveries in science and technology can be used for malevolent purposes. Switzerland presents a number of recommendations with regard to the responsiveness of international organizations, compliance with international law, possible new regulatory approaches, the multidisciplinary nature of the science and technology challenge, export controls as well as "science and security" as a priority for the United Nations. Switzerland is looking forward to the Secretary-General's report on science and technology pursuant to resolution 72/28 and hopes the present report will raise awareness of the topic and create a useful foundation for addressing current science-and-technology developments relevant to international security and disarmament efforts.

Opportunities

Advances across diverse areas of science and technology have profoundly positive impacts on and beneficial applications in our daily lives. information

technology connects people and facilitates communication. New medicines, therapies and vaccinations save lives, contribute to increased life expectancy and improve quality of life. It must be our shared goal to put technological progress in the service of advancing mankind and preserving our environment. Science and technology can notably facilitate achieving certain Sustainable Development Goals, like ensuring healthy lives and promoting well-being (Goal 3) or building resilient infrastructure, promoting sustainable industrialization and fostering innovation (Goal 9). Such developments can also have positive effects on the implementation of Goal 16, which aims at promoting peace, security and strong institutions.

Impact on international security and arms control

A number of technological developments may reinforce protection against specific security threats. At the same time, technological advances, for instance in the field of unmanned technologies, artificial intelligence and electromagnetic or materials technology, may result in the development of new weapons, means and methods of warfare, as efforts to develop more precise and efficient weapons are pursued. It is anticipated, for instance, that certain technical innovations may support human decision-making in the targeting cycle, or will allow for the more precise and efficient deployment of force with a view to avoiding or minimizing incidental harm to civilians and civilian objects. Another concrete example of a potential positive impact on international security and arms control would be the use of geospatial analysis, satellite imagery, 3D visualization or virtual reality to support specific disarmament or non-proliferation tasks, such as monitoring and verification activities.

Specific challenges

However, a number of legal, ethical, military and political questions arise from past, present and anticipated future developments in science and technology. How will these developments be used in a changing international security context involving global power shifts, geopolitical tensions, regional instabilities and the emergence of new actors? What will be the impact of novel weapons on warfare? Will current developments in science and technology result in profound changes in patterns of conflict? Will they lower the political threshold for the use of force, since they could reinforce the perception that one can wage war with minimal losses and complicate attribution, hence granting plausible deniability? Will there be new interest in weapons that were previously considered to be of little military utility, such as biological weapons, because advances in science and technology allow current technical and/or operational deficiencies to be overcome? What are the implications for international stability and security in the light of the pursuit and possible acquisition of new types of long-range conventional weapons? What are the security implications if not only States but also non-State actors acquire such weapons? How can advanced weapons be tested as part of the research and development process as well as in accordance with legal reviews, as specified in article 36 the Protocols additional to the Geneva Conventions of 12 August 1949? The current debate on autonomous weapon systems illustrates these multifaceted questions. Notably, discoveries in science and technology can also be used for malevolent purposes. Some new technologies are easily accessible, which means that proliferation risks and the threat from non-State actors need to be thoroughly assessed. In order to mitigate possible negative impacts, such challenges should be discussed and addressed in the relevant multilateral conventions and forums in the light of their potential impact on international security and disarmament. Switzerland believes that the international community would benefit from a common understanding of the opportunities and challenges of these technologies and how these can be addressed in multilateral forums.

Recommendations by Switzerland

1. *International organizations and treaty frameworks should be better equipped for science-and-technology discussions with a view to keeping pace with technological development. There is a need for responsive organizations and treaty frameworks that allow for the anticipation of trends and, if necessary, for normative considerations.*

Due to the complex and evolving nature of science-and-technology developments, it is difficult to comprehensively understand the risks associated with such advances and fully capture the challenges ahead. Appropriate intergovernmental structures where the relevant actors come together (see also point 4), where their complex interests can be taken into account and where new challenges can be addressed politically and normatively might currently be insufficient or lacking. Switzerland has been actively promoting the discussion and review of developments in science and technology and has suggested setting sufficient time aside to consider emerging challenges, in particular with regard to autonomous weapon systems and advances in the life sciences, within the framework of the Convention on Certain Conventional Weapons and the Biological Weapons Convention, respectively. Discussions in multilateral processes have illustrated the difficulties of finding common understanding on such topics. Moreover, some developments in science and technology, such as the convergence of the sciences, affect multiple treaties and, hence, call for greater interaction between previously separated disarmament communities, which further complicates the challenge of finding common ground. Being able to mitigate the negative effects of certain science-and-technology developments will be of great importance to humanity and a factor in maintaining the relevance of conventions such as the Convention on Certain Conventional Weapons and the Biological Weapons Convention, and the multilateral system as a whole.

2. *Ensuring compliance with existing international law must be a priority as future weapon systems are developed and employed.*

The existing rules of international law, and of international humanitarian law in particular, apply to all weapons, means and methods of warfare, including new weapon systems. Under international humanitarian law, any weapon possessing one or more of the following characteristics is inherently unlawful: (a) the weapon is of a nature to cause superfluous injury or unnecessary suffering; (b) the weapon is indiscriminate by nature; (c) the weapon is intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment; and (d) the weapon has been specifically prohibited in treaty or customary law. With regard to the lawful use of a weapon system, the principles governing the conduct of hostilities (distinction, proportionality, precaution) need to be considered. These criteria apply to all weapons, means and methods of warfare, including those based on new technologies. Furthermore, Switzerland reiterates that States have the obligation to conduct legal reviews, as specified in article 36 the Protocols additional to the Geneva Conventions of 12 August 1949, and to ensure accountability and responsibility. A rules-based international order contributes to international peace, security and the protection of human beings. Defending compliance and promoting international law is a priority for Switzerland. In the case of autonomous weapon systems, Switzerland has suggested the collation and clarification, for ease of reference, of the relevant existing provisions of international law. Such an endeavour could also be considered for other future weapon systems.

At the same time, vigilance is needed to prevent the emergence of attractive new types of weapons, means and methods of warfare from endangering or calling into question existing prohibitions or restrictions. For instance, central nervous system-acting chemicals could be seen as an attractive tool to manage certain law

enforcement scenarios because of their supposedly non-lethal incapacitating effect. However, the distinction between law enforcement, counter-terrorism, counter-insurgency and armed conflict may get blurred, which could lead to the unintentional or deliberate use of such chemicals outside of the confines of the law enforcement exemption of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (Chemical Weapons Convention). This could undermine the global norm against the use of toxic chemicals as weapons and may lead to the creeping re-emergence of chemical weapons.

3. *When and where existing norms are insufficient, new regulatory approaches must be considered before it is too late*

Groundbreaking developments might potentially lead to new weapons, means and methods of warfare for which existing norms prove to be insufficient. If and when such developments are anticipated or materialize, new politically or legally binding instruments, or a combination thereof, should be considered in due time and in the appropriate forums.

4. *The traditional arms control community should be expanded, or would benefit from more comprehensive, multidisciplinary settings*

Switzerland is convinced that the scientific community and the private sector need to be included when addressing science-and-technology challenges. These actors possess valuable knowledge and expertise, which must be brought to the table. They play an important role in multilateral policy-making areas and need to be aware of their interests and responsibilities. Within this broad approach, it is important to consider the power of peer pressure, transparency and confidence-building measures, such as industry best practice, mentoring, education or peer reviews.

5. *Export controls might need to be adapted in the light of dual-use challenges*

Since many new technologies are of a dual-use nature and often involve intangible goods, export controls might need to be adapted to meet these challenges. Currently, a number of such technologies are difficult to control based on existing mechanisms and tools for transfer control. Consequently, Switzerland believes in the importance of elaborating adapted export controls and achieving regulation without hampering valuable civilian and legitimate military development and use.

6. *Science and security should be anchored as a priority of the United Nations. The Secretary-General as well as Member States should receive sound and robust advisory opinions*

As outlined, science and technology holds great potential for humanity but, at the same time, could have significant potential impact on peace and security. This places science and technology at the top of the United Nations agenda, with the Secretary-General in a global leadership role. The Secretary-General has recognized the importance of science and technology in several United Nations domains and rightly placed science and technology in his prevention agenda, directly relevant to the mandate of the United Nations with regard to peace and security. In the disarmament agenda released 24 May 2018, the Secretary-General put forward a number of actions aimed at protecting future generations from emerging means and methods of warfare. Switzerland hopes that this disarmament agenda will contribute to better understanding risks and opportunities associated with science and technology and provide a platform upon which to advance the science-and-technology issues relevant to international security and disarmament efforts. In addition, Switzerland hopes the present report of the Secretary-General on this matter will not only further raise awareness of the issue, but also provide a stepping stone for a sustained follow-up process. Just as specific arms control and disarmament

conventions should be examined to see whether they are adequately set up to address the challenge of science and technology, the same should be done with regard to relevant United Nations organs and forums. It would seem worthwhile, for instance, to consider whether the Advisory Board on Disarmament Matters is a suitable body to provide an advisory function to the Secretary-General on such technically complex matters, or whether the Secretary-General and Member States need additional and sustained advisory functions. The creation of a panel of eminent experts, as briefly discussed during the seventy-second session of the First Committee of the General Assembly, could also have some merit.

Ukraine

[Original: English]
[15 May 2018]

Ukraine, as a member of all multilateral export control regimes, implements their decisions into its national legislation, including amendments to the control lists of goods developed to keep pace with international and regional security developments, advances in technology and market trends.

On 11 January 2018, the Cabinet of Ministers of Ukraine approved the Single List of dual-use goods.

According to the Law of Ukraine No. 549-IV of 2003 on state control of international transfers of goods designated for military purposes and dual-use goods, Ukraine controls intangible technology transfers as release of technology which takes the form of technical data or technical assistance. It is considered that such release could take place by any electronic means (email, fax, telephone, etc.)

Controls do not apply to technology in the public domain, basic scientific research or the minimum necessary information for patent applications.

United States of America

[Original: English]
[15 May 2018]

Resolution 72/28 was adopted without a vote. The United States firmly believes that science and technology present both opportunities and challenges in the context of international security and disarmament. Therefore, reviewing developments in science and technology is important to understanding such possible future opportunities and challenges. In that context, the United States welcomes discussions related to scientific and technological developments, including technology of relevance to international security and disarmament, and to peaceful uses, that appropriately and fruitfully are being conducted in existing forums. Many of these venues have open mandates to address various aspects of such issues and, thus, are best suited to review and assess the possible implications of those developments. Resolution 72/28 rightfully acknowledges related mandates and work under way in such forums, including the International Atomic Energy Agency (IAEA) and the Organization for the Prohibition of Chemical Weapons (OPCW), as well as related discussions in the United Nations Committee on the Peaceful Uses of Outer Space and under the framework of the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (Convention on Certain Conventional Weapons).

In resolution 72/28, the General Assembly also refers to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons Convention and on Their Destruction (Biological Weapons Convention), article XII of which provides that its Review Conferences "take into account any new scientific and technological developments relevant to the Convention". In that context, the United States welcomes the decision at the Meeting of States Parties to the Biological Weapons Convention to conduct annual meetings of experts on five issues in 2018, 2019 and 2020, including one on the theme "Review of developments in the field of science and technology related to the Convention". The United States looks forward to all the meetings of experts to be held in August 2018 and hopes that the science and technology experts, in addition to the standing agenda item on genome editing, will assess the evolving nature of risks and benefits associated with advances in science and technology and focus also on the responsible conduct of research in the life sciences, including on codes of conduct. In fact, a number States parties to the Biological Weapons Convention, including the United States, supported the creation of a science and technology review mechanism (BWC/CONF.VIII/PC/WP.3).

Although sympathetic to the desire to understand future technology trends in the context of international security, the United States supports the current practice of addressing focused science-and-technology issues in existing bodies, which is appropriate given the broad range of potential developments and the broad range of different contexts in which these developments might affect international security and disarmament. For example, the United States does not believe that a United Nations high-level panel of experts tasked with assessing current developments in science and technology and their potential impact on international security and disarmament efforts could achieve a useful outcome. One concern among others is that a small panel of experts drawn from a diverse set of fields and convened for meetings over a limited period of time would have difficulty in developing informed assessments that span a broad spectrum and that could make new contributions to the deliberations of the General Assembly.

United Nations A/73/178

General Assembly

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Seventy-third session
Item 74 (b) of the provisional agenda*
Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms

Human rights of migrants

Note by the Secretary-General

The Secretary-General has the honour to transmit to the General Assembly the report of the Special Rapporteur on the human rights of migrants, Felipe González Morales, in accordance with Human Rights Council resolution 34/21.

* A/73/50.

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Report of the Special Rapporteur on the human rights of migrants

Summary

The present report outlines the main activities undertaken by the Special Rapporteur on the human rights of migrants since the most recent report to the General Assembly. The report contains a study on effective access to justice for migrants, which includes the right to information and interpretation, legal aid and representation, consular assistance and access to remedies and redress. The study analyses the obstacles faced by migrants in their access to justice and stresses the need to foster the establishment of "firewall" protections to safeguard this right. In addition, the study contains recommendations to States to ensure effective access to justice for migrants, including those with particular protection needs.

I. Introduction

1. The present report is submitted to the General Assembly by the Special Rapporteur on the human rights of migrants pursuant to Human Rights Council resolution 34/21.

II. Activities[1]

2. On 11 May 2018, the Special Rapporteur gave a lecture on migration policy and human rights at the Autonomous University of Madrid. On 17 May, he was a keynote speaker at a conference on trafficking and corruption at Carlos III University, Madrid.

3. From 4 to 8 June 2018, the Special Rapporteur participated in the annual meeting of special procedures in Geneva. On 13 June, he participated in a panel discussion on human mobility in times of populism at American University, Washington, D.C.

4. On 20 June 2018, the Special Rapporteur presented his first thematic report to the Human Rights Council (A/HRC/38/41) on the return and reintegration of migrants. On 22 June, he participated as a speaker at a side event organized by the non-governmental organization (NGO) World Alliance for Citizen Participation (CIVICUS) on the shrinking of civic space in the European Union and the criminalization of assistance to migrants.

5. From 9 to 13 July 2018, he attended the last round of negotiations on the Global Compact for Safe, Orderly and Regular Migration in New York.

6. On 18 July 2018, he participated in a conference in San José, Costa Rica on the fortieth anniversary of the entry into force of the American Convention on Human Rights and the establishment of the Inter-American Court of Human Rights, during which he delivered a presentation as a member of a panel discussing contemporary global challenges for human rights protection systems.

III. Effective access to justice for migrants

A. Introduction

7. Effective access to justice means that everyone, without discrimination, has the right to access the system provided for conflict resolution and the restoration of rights. Access to justice has a dual role, as a fundamental right inherent to every person and as a principle that establishes obligations for States, particularly to ensure that anyone can approach the courts to seek protection of their rights. States, under international human rights law, have an obligation to guarantee the human rights of all individuals under their jurisdiction, regardless of their nationality or migration status, including the right to access to justice and due process.[2]

8. The following sections analyse the rights and key elements that make up effective access to justice, such as the right to legal aid and representation, the right to information and an interpreter, the right to consular assistance, the competent authority to which access is provided, as well as remedies and redress. These guarantees of due process are applicable to all migrants, regardless of their migration status, to enable them to claim their rights in migration procedures or asylum

[1] For activities between August 2017 and April 2018, see A/HRC/38/41.

[2] International Covenant on Civil and Political Rights, art. 2.

applications, or in the case of detention or expulsion, labour exploitation or any other violation of their human rights.

9. Contributions to the study were made by a number of civil society organizations, as well as teams of lawyers from Diego Portales University, Santiago and Carlos III University, Madrid.

B. Legal assistance and representation

10. Legal representation of persons stems from the concept of due process, both of which are enshrined in the Universal Declaration of Human Rights. Articles 7, 8 and 11 provide that all persons are equal before the law and are entitled to equal protection under the law. The Declaration also provides that "everyone has the right to an effective remedy by the competent national tribunals for acts violating their fundamental rights" (art. 8). It may be inferred from article 10 of the Declaration that this requires specialized legal aid and representation, free of charge for those who cannot access it. The International Covenant on Civil and Political Rights prescribes that migrants in a regular situation may be expelled only in pursuance of a decision reached in accordance with law, so that they may submit the reasons against their expulsion and be represented before the competent authority (art. 13). It adds that "everyone shall be entitled to a fair and public hearing by a competent, independent and impartial tribunal" (art. 14). The Special Rapporteur stresses that migrants enjoy a right to technical legal assistance, which should be provided by the State free of charge for those who cannot afford it, to truly operationalize the right to due process.

11. The African Charter on Human and Peoples' Rights stipulates that the right to a fair trial includes the right to be defended (art. 7). The African Union has adopted the Principles and Guidelines on the Right to a Fair Trial and Legal Assistance in Africa, which set forth the right to equal access to lawyers and free legal aid, and in its Migration Policy Framework for Africa and Plan of Action 2018–2027, the Union emphasizes strengthening legal assistance for migrants who are victims of smuggling, organized crime and trafficking in persons. In addition, the right to be defended in administrative cases has been established, meaning that free legal assistance must also be provided in migration procedures.[3]

12. The Charter of Fundamental Rights of the European Union includes the obligation to develop an effective system of access to justice, which encompasses the right to have the possibility to be advised, defended and represented. In addition, it refers to free legal assistance for those who do not have sufficient resources. European case law has established that the State must guarantee access to justice, de jure and de facto, so that if it does not provide a free legal aid system, it must inform the applicant about organizations that do so.[4]

13. The European Union has ruled that States parties must facilitate the provision of advice on the asylum procedure and on the rights and obligations of the applicants in their own language. However, free legal assistance has been limited to those applicants whose applications has received a negative response.[5] According to reports from civil society, rights such as free legal assistance, information and translation

[3] For case law in the African region, see 224/98, *Media Rights Agenda v. Nigeria, 14th Annual Activity Report* [*Compilation 1994–2001*, Institute for Human Rights and Development in Africa, Banjul, 2002, pp. 286–300], in which the African Commission on Human and Peoples' Rights applied general comment No. 13 (1984) of the Human Rights Committee on the administration of justice, with regard to legal assistance.

[4] European Court of Human Rights, *M.S.S. v. Belgium and Greece*.

[5] Directive 2013/32/EU of the European Parliament and of the Council of 26 June 2013 on common procedures for granting and withdrawing international protection (recast), art. 39.

have not been, nor are they currently, fully guaranteed in Germany,[6] France,[7] Greece,[8] Hungary[9] or Italy.[10]

14. The American Convention on Human Rights recognizes, in its article 25, the right to judicial protection, which safeguards the right to legal representation. That right is protected by providing efficient and equitable legal assistance for those in need. Article 8 of the Convention provides that all accused persons have the right to defend themselves personally or to be assisted by counsel of their own choosing and to communicate freely and privately with their counsel. The Inter-American Court of Human Rights has found that "due process of law is a right that must be ensured to all persons, irrespective of their migratory status".[11]

15. The Special Rapporteur stresses the fundamental role of NGOs, university legal clinics and law firms that take on pro bono work, among others, in the legal representation of migrants. Nevertheless, he recalls that this does not free the State from its responsibility to provide free legal assistance and representation.

16. The protection of access to justice and its relationship to due process is particularly relevant in cases of forced displacement and the determination of refugee status. The risk of a person being returned to a place where his or her life or liberty is threatened means that States must take particular account of these protections, especially the principle of non-refoulement, in order to avoid violating the person's human rights. Although the Convention relating to the Status of Refugees of 1951 does not expressly establish a right to due process in the procedures for recognition of refugee status, international human rights standards in the area of procedural safeguards are applicable.

C. The right to information and an interpreter

17. The right to information is essential for the exercise of other rights, including access to justice. NGOs and international organizations provide information and raise awareness among migrants regarding their right to access to justice through the production and dissemination of explanatory materials on the rules that protect migrants. Of note among such initiatives is the "Contratados.org" digital platform created by Centro de los Derechos del Migrante (centre for migrant rights) to increase transparency in the hiring of migrants. The Centre also conducts leadership programmes to empower migrant workers in their demands for justice, through community leaders who sit on migrant defence committees. Organizations such as the Centre also advise migrants and connect them with networks of NGOs, lawyers and public servants that provide legal support.[12] Often migrants are not properly informed

[6] European Union Agency for Fundamental Rights, *Monthly migration report*, December 2017.

[7] Asylum Information Database, France (2017), available at http://www.asylumineurope.org/reports/country/france/asylum-procedure/guarantees-vulnerable-groups-asylum-seekers/age-assessment.

[8] AITIMA, Greece (2017), *Asylum seekers on hold: Aspects of the asylum procedure in Greece*, April 2017; see also European Court of Human Rights, *M.S.S. v. Belgium and Greece*.

[9] Asylum Information Database, Hungary (2017), available at http://www.asylumineurope.org/reports/country/hungary/asylum-procedure/procedures/regular-procedure # footnote19_nj2htk4.

[10] Centro operativo per il diritto all'asilo, *Diritto di asilo. Regole ed eccezioni nella prassi della Pubblica Amministrazione: Il monitoraggio di Coda sul territorio di Roma*, October 2015, p. 24; Asylum Information Database, *Country Report Italy*, 34.

[11] Inter-American Court of Human Rights, Advisory Opinion 18/03 of 17 September 2003 on the juridical condition and rights of undocumented migrants, para. 121; see also Inter-American Court of Human Rights, *Nadege Dorzema et al. v. Dominican Republic*, Judgment of 24 October 2012.

[12] Submission by Centro de los Derechos del Migrante.

about how their data will be processed and find it difficult to understand the information they receive.[13]

18. In order to ensure effective access to justice for migrants, States must make available the necessary economic and human resources to provide them with information in a language they can fully understand on the procedures and procedural safeguards they can call upon if their human rights are violated. The International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families recognizes the right of migrants to be assisted free of charge by an interpreter if they are arrested (art. 16) or charged with a criminal offence (art. 18). The Committee on the Elimination of Discrimination against Women also recommends that States remove linguistic barriers by providing independent and professional translation and interpretation services, when needed, in order to guarantee the full understanding of judicial processes.[14] The Human Rights Committee has referred to the obligation of States to ensure that persons seeking international protection are given access to an interpreter as a guarantee of due process and has also referred to the obligation to respect the principle of non-refoulement.[15]

19. The Inter-American Court of Human Rights has stressed the obligation to provide an interpreter "when one is unfamiliar with the language in which the proceedings are conducted".[16] It also has indicated that States must take into account the basic procedural guarantees in keeping with the principles of the child's best interest and comprehensive protection, which include provision of an interpreter, if required, who is highly qualified to interview children.[17]

20. The European Court of Human Rights has noted that, when migrants are detained, they have the right to receive information in a language that allows them to understand the reasons for detention, the procedure and the procedural safeguards that can be invoked.[18] According to information from the European Union Agency for Fundamental Rights, the police provides free interpretation to migrants in most (26) of the States in the Union. The African Commission on Human and Peoples' Rights, in its resolution on the right to recourse and to fair trial, has established that the right to a fair trial includes the right to the free assistance of an interpreter.[19]

D. The right to consular assistance

21. Consular assistance is also essential for effective access to justice for migrants. It is particularly urgent in the case of persons deprived of their liberty, whether for criminal or immigration reasons, as it often has a decisive impact on respect for procedural guarantees. The Vienna Convention on Consular Relations establishes that if the interested party "so requests, the competent authorities of the receiving State shall, without delay, inform the consular post of the sending State if, within its consular district, a national of that State is arrested or committed to prison or to custody pending trial or is detained in any other manner (art. 36, para. (b)). This is

[13] Submission by the European Union Agency for Fundamental Rights.

[14] See general recommendation No. 33 (2015) on women's access to justice.

[15] See CCPR/C/MLT/CO/2.

[16] Inter-American Court of Human Rights, Advisory Opinion No. 16/99 of 1 October 1999 on the right to information on consular assistance in the framework of the guarantees of the due process of law, para. 120.

[17] Inter-American Court of Human Rights, Advisory Opinion No. 21/14 of 19 August 2014 on the rights and guarantees of children in the context of migration and/or in need of international protection.

[18] European Court of Human Rights, *Saadi v. Italy*.

[19] Available at http://www.achpr.org/sessions/11th/resolutions/4/.

stipulated in article 16, paragraph 7, of the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families. Consular assistance is also very important in the area of employment, as migrants are often victims of workplace abuses that may be as serious as trafficking and exploitation. Hence the importance of States providing consular assistance in this regard, through the creation of labour attaché offices or other mechanisms.

22. The right to consular assistance is primarily a right of migrants and only a conditional right of the State of origin because migrants may prefer not to contact their State out of fear of persecution or other reasons. The receiving State has an obligation, inter alia, to inform migrants detained under their jurisdiction without delay of their right to be assisted by consular officials of their country of nationality and of their right to communicate with the consular authorities of their country, as well as to receive effective consular assistance. This was noted by the International Court of Justice, when it declared that article 36 of the Vienna Convention on Consular Relations establishes individual rights that may be claimed by the national of the sending State and that create an imperative for the receiving State, which is why the obligation goes beyond relations among States and refers to the protection of a human right.[20] The Inter-American Court of Human Rights has ruled in the same fashion.[21] For their part, European Union treaties provide for the possibility that a national of a member State located in a country outside of the State of origin and that does not have diplomatic representation may receive the consular protection of a European Union member State and that the treatment accorded must be the same as that which a national of that State would receive.[22]

23. In practice, migrants often find that their consulates abroad are unable to help them. Embassies often lack effective communication mechanisms, do not provide adequate support to ensure free legal assistance and tend not to become involved in detention cases. Moreover, they are usually not informed of the detention of their nationals, with the result that they act late and migrants turn to NGOs for assistance. While some consulates offer legal advice on litigation, the practice is not common or sufficiently effective or comprehensive.[23]

E. Competent authorities

24. The type of authority to which individuals have access in immigration relations with the State directly affects the exercise of effective access to justice. In cases of refusal of entry, asylum applications and deportation, access is provided only through an administrative authority in some States. In other cases, access is provided to both an administrative and a judicial authority through procedural remedies. Some States also provide for the possibility of directly addressing a judicial authority. For example, the rules in the United States of America are unique because immigration judges do not belong to the judicial branch but rather report to the Office of the Attorney General. In certain cases, it is possible to petition a federal court of appeals; such courts are part of the judicial branch.

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[20] International Court of Justice, *The Vienna Convention on Consular Relations (Paraguay v. United States of America)*, Provisional Measures of 9 April 1998; *LaGrand (Germany v. United States of America)*, Judgment of 27 June 2001; *Avena and other Mexican Nationals (Mexico v. United States of America)*, Judgment of 31 March 2004.

[21] Inter-American Court of Human Rights, Advisory Opinion No. 16/99 of 1 October 1999, on the right to information on consular assistance in the framework of the guarantees of the due process of law; *Case of Vélez Loor v. Panama*; Judgment of 23 November 2010; and *Case of Expelled Dominicans and Haitians v. Dominican Republic*, Judgment of 28 August 2014.

[22] Treaty on the Functioning of the European Union, art. 23.

[23] Submission by Migrant Forum Asia.

25. The administrative remedies available in some States provide for the review of decisions by superior bodies, usually the Ministry of Justice or a collegiate body composed of representatives of the executive branch. In a few cases, countries are directly supported by the Office of the United Nations High Commissioner for Refugees (UNHCR) or academic experts. When administrative decisions are reviewed by authorities attached to the executive branch — especially the Ministry of the Interior, which is directly involved in matters of order and security and, thus, criminalization — this may endanger the human right to an effective remedy in accordance with international human rights standards,[24] as it prevents an impartial analysis of the status of the foreign national.

26. In the European Union, Directive 2008/115/EC on common standards and procedures in member States for returning illegally staying third-country nationals establishes minimum common legal safeguards for decisions pertaining to the return of irregular migrants that are not respected by all member States. It prescribes, inter alia, that decisions on return, entry bans and removal shall be issued in writing and include reasons in fact and in law and information about available legal remedies. Further, while enshrining the effective right to lodge an appeal before a judicial body, an administrative authority or other competent body, it requires that the review body be composed of impartial members whose independence is guaranteed, which is difficult to enforce when a review is purely administrative.

27. This European directive has also been criticized because a postponement of the removal decision is established only as a possibility and not an obligation, which has allowed a person to be removed immediately after being notified of a decision.[25] In the case of Directive 2005/85/EC on minimum standards on procedures in member States for granting and withdrawing refugee status, there is a stricter requirement, because it establishes the obligation to provide for the right to a judicial review of administrative decisions on asylum.

28. The three immigration procedures identified are subject to different rules. There is greater regulation of asylum and removal procedures and less regulation of denial of entry, which is generally a step taken by border immigration authorities that form part of the executive branch. Regulations are often confusing and require the analysis of other normative instruments to determine whether they allow for appeals and under what terms, hindering the proper exercise of rights, which is exacerbated when laws are in a language other than the native language.

29. In countries that do not allow for appeals of administrative decisions before a judicial authority, decisions to deny entry and remove persons are not always contained in an administrative act and are only communicated verbally by the representative of the immigration authority to the foreign national, resulting in a lack of certainty about the reasons for the act and undermining the right to a defence.

30. In some countries that allow for appeals against administrative decisions through the courts, notice of refusal of entry is given verbally and is not subject to any kind of appeal, which is an exception to the general rule of a well-founded administrative act as provided for by the majority of countries, which allows for the proper exercise of the right to a defence. Other countries provide for direct access to

[24] International Covenant on Civil and Political Rights, art. 2, para. 3 and American Convention on Human Rights, art. 25, para. 1. Similarly, general comment No. 15 (1986) of the Human Rights Committee, on the position of aliens under the covenant, indicates that "an alien must be given full facilities for pursuing his remedy against expulsion so that this right will in all the circumstances of his case be an effective one. The principles of art. 13 relating to appeal against expulsion and the entitlement to review by a competent authority may only be departed from when 'compelling reasons of national security' so require" (para. 10).

[25] See Court of Justice of the European Communities, *Dem'Yanenko* case.

the courts without a prior administrative appeal. In such cases, migrants have access to administrative courts, sometimes with the right of appeal to a higher court. Some systems provide for the possibility of access to the high court. Italy has recently established a special section on immigration, international protection and free movement of citizens.

31. Access to a judicial review of the detention of migrants and asylum seekers is also impeded by the elimination of procedural safeguards such as ex officio judicial reviews of detention orders and the poor prospects for a successful appeal against such orders while the person is in a detention centre prior to removal.[26]

32. In recent years, some States have adopted reforms affecting the independence and effectiveness of the bodies that review negative asylum decisions. For example, in Greece, following the adoption of the agreement between the European Union and Turkey on 18 March 2016, the composition of the review body was amended, affecting the way in which it rules on appeals against decisions deeming applications for asylum inadmissible based on the "safe third country" concept. Derogations from the general rules of administrative procedures may also occur in the bodies that review asylum applications, to the detriment of applicants. For example, several countries have limited the range of circumstances in which a review is available to asylum seekers in order to expedite proceedings.[27]

F. Firewall protections

33. "Firewalls" establish a strict and real separation between immigration enforcement and public services, meaning that immigration authorities cannot have access to information regarding the migration status of visitors to public services, and that the institutions responsible for providing such services are not required to investigate or share information on the migration status of their users.[28] These institutions include service providers in the fields of education, health, social security, social assistance and labour protection, as well as the police and the judicial system. As the only mechanisms that allow migrants to exercise and enjoy their human rights without fear of being reported to the immigration authorities, "firewalls" are an inescapable consequence of the State's obligation to protect all persons under its jurisdiction against discrimination, in accordance with international human rights norms and standards.[29]

34. The establishment of "firewall" protections is key to ensuring migrants' access to justice. One of the reasons for their difficulty in having access to an effective remedy before the courts is their fear that their migration status will be discovered during the proceedings and that they will be detained and subsequently deported.[30] In this regard, "firewalls" allow migrants who are in an irregular situation and are afraid of being discovered and deported, or those who are in a precarious legal situation and afraid of ending up in an irregular situation, to report offences as either victims or

[26] Submission by University of Texas School of Law, Human Rights and Immigration Clinics, Locking up Justice.

[27] Submission by the International Commission of Jurists (ICJ)/European Council on Refugees and Exiles (ECRE).

[28] François Crépeau and Bethany Hastie, "The Case for 'Firewall' Protections for Irregular Migrants: Safeguarding Fundamental Rights", *European Journal of Migration and Law*, vol. 17, 2015, p. 165.

[29] Council of Europe, European Commission against Racism and Intolerance (ECRI), *General Policy Recommendation No. 16 on Safeguarding Irregularly Present Migrants from Discrimination, adopted on 16 March 2016* (2016), 16.

[30] A/HRC/26/35, paras. 19, 57, 100 and 103.

witnesses, obtain legal assistance and gain access to the courts to defend their rights, which, moreover, helps to fight impunity.[31]

35. The Committee on the Protection of the Rights of All Migrant Workers and Members of Their Families has affirmed that the establishment of "firewalls" to protect such workers in their interaction with public authorities is one of the measures that should be taken by States.[32] Furthermore, joint general comment No. 3 (2017) of the Committee on the Protection of the Rights of All Migrant Workers and Members of Their Families and No. 22 (2017) of the Committee on the Rights of the Child on the general principles regarding the human rights of children in the context of international migration notes that "States parties should implement a 'firewall' and prohibit the sharing and use for immigration enforcement of the personal data collected for other purposes, such as protection, remedy, civil registration and access to services".[33]

36. In terms of labour protection, the International Labour Organization (ILO) has noted that "firewall" protections are needed between the authorities responsible for labour inspections and the immigration authorities, to ensure that migrant workers who suffer abuse have access to effective remedies and redress, including financial compensation.[34]

37. The United Nations High Commissioner for Human Rights (UNHCR) has also recommended that States include explicit guarantees for the protection of personal data in information-sharing agreements concluded between States, as well as between agencies within the same State. These guarantees should include establishing "firewalls" between immigration authorities and public services.[35]

1. Laws, policies and practices that foster firewall protections

28. Despite the fact that the current global context — characterized primarily by a security-centred approach and the criminalization of irregular immigration — is largely at odds with the existence of "firewalls" between public services and immigration authorities, it is possible to identify some good practices, most of which tend to occur at the local and regional levels.[36] These are the levels at which a greater number of public services are provided, and which are generally not responsible for immigration enforcement or the implementation of immigration legislation. Of note in that regard are measures designed to encourage or ensure migrants' access to public services and their participation in the community, as well as the laws and practices

[31] The European Union Agency for Fundamental Rights, *Apprehension of migrants in an irregular situation*, 2013.

[32] A/69/48, para. 16.

[33] Para. 17. At the European regional level, see also the European Union Agency for Fundamental Rights, *Apprehension of migrants in an irregular situation*, 2013 and ECRI, *General Policy Recommendation No. 16*, 2016, p. 15.

[34] International Labour Organization (ILO), Committee of Experts on the Application of Conventions and Recommendations, *Promoting fair migration — General Survey concerning the migrant workers instruments*, report III (1B), 2016, paras. 480–482.

[35] Office of the United Nations High Commissioner for Refugees (UNHCR), *Recommended Principles and Guidelines on Human Rights at International Borders*. See also A/HRC/37/34/Add.1.

[36] For example, see United Nations Children's Fund (UNICEF), *Beyond borders: how to make the global compacts on migration and refugees work for uprooted children*, 2017, p. 26, where it is noted that "in cities including Geneva, Munich and Seoul, the solution has been to establish 'firewalls' that keep information from being shared between service providers and immigration authorities".

that explicitly prohibit the transfer of information and abolish the obligation to report the irregular migration status of individuals.[37]

39. Laws and practices that clearly prohibit the transfer of information and abolish the obligation to report the irregular migration status of individuals allow public employees to have legal certainty when exercising their functions and help to reduce the fear that migrants have concerning access to public services. Such measures have been taken in some European States, particularly with regard to health and education services. In Greece and Italy, for example, where no prohibitions existed against reporting irregular migrants, civil society has mobilized to protect migrants. Some municipalities and regional entities, particularly in the United States, have adopted laws that explicitly state a refusal to collaborate with immigration authorities.[38] This is the case with so-called "sanctuary cities", where a city or jurisdiction becomes a safe haven for migrant families. By not implementing immigration laws or refusing to share information with immigration authorities, sanctuary cities allow families to access public services without fear of suffering harm. While sanctuary cities do not provide total protection, given that immigration authorities can still have access to them, the legislation adopted by each State to protect its residents can be of great help to immigrants who urgently require public services.[39]

2. Laws, policies and practices that hinder or restrict firewall protections

40. Identity checks, allegedly conducted at random to detect migrants in an irregular situation, are quite prevalent in Canada, the United States and Europe. These checks are often carried out as part of routine traffic checks or in public places, such as on public transport or in schools or health centres, thus making it difficult to establish "firewalls" between those services and immigration authorities. Furthermore, it has been alleged that such checks are discriminatory as they target certain nationalities and ethnic groups.[40]

41. The obligation to report migrants in an irregular situation primarily exists in those States in which an illegal entry or stay in the country is a criminal offence. Even in States where it is not a crime, certain individuals, including health officers, school personnel and landlords, have an obligation to report an irregular situation when they become aware of it. The same applies to the creation of shared databases and the establishment of legal obligations to share information concerning persons in irregular migration situations. An example of these kinds of practices is the "Secure Communities" programme in the United States, which makes it possible to ascertain the migration status of all persons arrested in the country, in order to identify those who are in violation of immigration laws.[41] In the United Kingdom, the laws and policies that impede firewall protections have adversely affected the exercise by migrants in an irregular situation of their social rights, such as health and education.

42. Lastly, inspections and raids conducted in certain locations to identify migrants in an irregular situation become particularly problematic when they occur in the workplace or near the public and social services to which migrants are entitled or need access.[42]

[37] Crépeau and Hastie, "The Case for 'Firewall' Protections for Irregular Migrants", pp. 176–182.
[38] Ibid., pp. 18–182.
[39] D. Feinstein, J. Flake and D. Vitter, "Sanctuary Cities", *Congressional Digest*, vol. 94, No. 7, 2015, p. 13.
[40] Crépeau and Hastie, "The Case for 'Firewall' Protections for Irregular Migrants", pp. 170–172.
[41] Ibid., pp. 172–173.
[42] Ibid., pp. 173–176.

G. Obstacles to effective access to justice

43. Facilitation of arrival in or entry into the territory of a State is a crucial part of ensuring that migrants have access to justice. In recent years, in many countries and regions of the world, a number of measures have been taken — readmission agreements, exceptions to safe country status, expulsion and non-admission, and the establishment within national territory of areas in which the normal legal rules do not apply and in which non-admission is presumed — that undermine or obstruct effective access to justice for migrants. These measures, which are aimed at expediting the return of migrants, often deprive migrants of their right to seek international protection and have their cases considered individually on the basis of procedural guarantees. Such measures are therefore incompatible with the principle of non-refoulement.[43]

44. Another method States resort to in order to limit access to justice in migration and expulsion procedures is the creation of exceptions on national security grounds. Such exceptions are then invoked to carry out expulsions in lieu of conducting extradition proceedings subject to judicial review. In general, the definition of national security, public order or public policy in migration law that is invoked to carry out expulsions is extremely vague and thus has an impact on due process and the principle of non-refoulement.[44]

45. The specific challenges faced by asylum seekers in gaining access to justice include expedited asylum procedures with fewer safeguards and limited ability to appeal denied asylum applications. For example, in the European Union, the deadlines for appealing decisions to deny asylum at the first-instance level vary from one country to another, ranging from one week to two months in regular procedures. In addition, special procedures may be applied depending on the asylum seeker's profile, migration route and point of entry, with more limited safeguards than those provided for under the regular procedure (that is, shorter time frames within which to appeal a decision not to grant asylum, detention of asylum seekers pending appeal and lack of access to legal assistance). In some countries, derogations from the general rules applicable to asylum seekers have been declared unconstitutional (by the Austrian Constitutional Court, for instance).[45]

46. The automatic suspension of the enforcement of a denial of asylum at the first-instance level and of the resulting removal procedure, as well as the right to remain in the country as long as necessary to lodge and obtain a decision on an appeal, constitute fundamental guarantees for asylum seekers. Nevertheless, some States do not automatically grant such suspension, as in the case of individuals whose asylum applications, processed through the expedited procedure, have been denied at the first-instance level.[46]

47. The migrant worker population also faces obstacles in gaining effective access to the labour courts when attempting to claim employment salaries and benefits or report discriminatory dismissal or sexual harassment. A lack of information and knowledge concerning their rights and how to exercise them in the legal system; an irregular migration status and the resulting fear of seeking remedies from the courts; economic and time constraints; the unavailability of free legal advice; and mistrust of the justice system constitute the main obstacles. Migration status is a significant

[43] Submission by ICJ/ECRE.
[44] Ibid.
[45] Ibid.
[46] Ibid.

factor in access to justice; individuals whose situation is irregular face greater barriers to access.[47]

48. Migrants who are temporary workers also face hindrances in gaining access to justice, given that the return to their countries of origin stipulated by temporary labour migration programmes creates a geographical barrier to claiming their rights. The 2014 legislation adopted by the State of California (United States) provides an example of good practice in strengthening migrant protection in the area of recruitment. The law requires the employer to utilize only recruitment agencies registered in the state, prohibits the collection of recruitment fees from workers and stipulates that workers must be given contracts at the time of recruitment. This makes employers more accountable for labour abuses.[48]

49. Other forms of abuse endured by migrants include confiscation of their documents and denial of the right to an interpreter.[49] They are also subject to mass expulsions following visa raids, as has been the case in Kuwait, Oman, Saudi Arabia and United Arab Emirates. However, destination States do not investigate the reasons and circumstances leading to the irregular situation or establish to what extent sponsorship and recruitment agencies may be responsible.[50]

50. In general, men migrant workers are more likely to bring claims in court than women migrant workers. This gender gap, which is larger in rural areas, is attributable mainly to a lower level of empowerment among women, who also have limited access to information about their rights and face time constraints, particularly in the case of domestic workers. Indigenous migrants also have very limited access to labour courts, owing generally to linguistic and cultural barriers and to public institutions' lack of awareness and knowledge of the specificities of indigenous peoples. Another contributing factor is the perception among indigenous migrants that the judicial system is alien to their own traditional conflict resolution methods.[51]

51. Family members of migrants who have disappeared on the migratory route also face challenges in pursuing justice. In Mexico, for example, cases are rarely reported, and it is impossible, without a mechanism for coordinating response between Mexico and the countries of origin of missing migrants, to assess the extent of the phenomenon, although it is believed to be massive. The institutional shortcomings that prevent family members from gaining access to justice and obtaining reparation include a lack of coordination between countries of origin, transit and destination; delays in conducting investigations and searches for missing persons, and a lack of transnational investigations. In response, family members of migrants who have gone missing in El Salvador, Guatemala, Honduras, Mexico and Nicaragua have formed committees. Family members also suffer the traumatic consequences of a lack of due diligence in the forensic identification of their loved ones.[52]

52. Migrants are also victims of hate crimes because of racial discrimination, xenophobia and other reasons. Such incidents are generally not reported out of fear and distrust of the police, which hinders migrants' access to justice.[53]

53. Migrants who are victims of trafficking are deeply distrustful of the justice system, which they perceive as corrupt. They are also afraid of the police. As a result,

[47] Submission by ILO and the judicial branch of the Government of Costa Rica.
[48] Submission by the International Labour Recruitment Working Group.
[49] Submission by University of Texas School of Law, Human Rights and Immigration Clinics, Locking up Justice.
[50] Submission by Migrant Forum Asia.
[51] Submission by ILO and the judicial branch of the Government of Costa Rica.
[52] Submission by the Mesa de Coordinación Transfronteriza "Migraciones y Género" (cross-border coordination bureau "migration and gender").
[53] Submission by the European Union Agency for Fundamental Rights.

they turn to other migrants or their families for help. As recruitment agencies are often involved in trafficking and exploitation, victims believe that the agencies are acting with impunity owing to corruption.[54] In addition, many recruitment agencies operate from a third country in order to circumvent the labour courts of the country in which migrants are working.[55] Thus, victims of trafficking rarely turn to the justice system or prefer to accept lower amounts of compensation.[56]

54. There are also many institutional barriers. While establishing that a person has been victimized is the first step towards gaining access to justice, it proves difficult to do so, owing to the authorities' lack of specialized knowledge and awareness, a lack of awareness on the part of the general public, and the shortcomings of the institutions and services responsible for providing assistance. As a result, many victims of trafficking are treated as undocumented migrants and deported. The lack of information and knowledge (concerning the legal consequences of being recognized as victims, for example) on the part of victims and authorities, the lack of accessible legal assistance (in rural and remote areas, for instance), and the duration and cost of criminal proceedings are additional barriers that hinder migrants who are victims of trafficking from gaining access to justice.[57] In West and Central Africa, one of the main challenges rescued victims face is the absence of a safe location and environment for them while receiving legal assistance.[58]

55. In addition, obtaining compensation is a major challenge. It is generally easier to obtain compensation in the labour courts than it is to obtain it in the criminal courts for trafficking offences. Labour litigation is speedier, the labour courts authorize direct payment of compensation to migrants and punishment of those responsible, while the definition of exploitation is broader (for example, there is no obligation to prove intent). However, in many cases the amounts available are completely inadequate considering the harm caused, contrary to what is stipulated in anti-trafficking laws, which also allow for compensation for non-material damage.

56. Very few victims of trafficking have obtained compensation in criminal proceedings owing to the difficulties of investigating transnational cases and the insufficient support provided to victims throughout the process.[59] Embassies' slow pace of work and their failure to undertake effective follow-up of the proceedings, even when a favourable judgment has been handed down, also hinder effective access to justice and redress for migrants returning to their countries of origin.[60]

57. According to some studies, a real possibility of regularization of residence status, the provision of individualized support services, a genuine chance of receiving compensation and access to and participation in criminal proceedings are the factors that would enable migrants to escape abuse and exploitation and afford them access to justice. In any event, States should not require migrants who are victims of trafficking to cooperate with the justice system in order to receive assistance.[61]

[54] Submission by ILO and the judicial branch of the Government of Costa Rica.
[55] Submission by the International Organization for Migration (IOM).
[56] Submission by ILO and the judicial branch of the Government of Costa Rica.
[57] Ibid.
[58] Submission by IOM.
[59] Ibid.
[60] Submission by Migrant Forum Asia.
[61] Submission by the European Union Agency for Fundamental Rights.

H. Migrants with particular protection needs

1. Migrant children

58. Children and adolescents are one of the weakest links within migratory flows, especially if they are not accompanied by their parents, relatives or a responsible, trustworthy adult who protects them from abuse, violence and exploitation and other risks. If this is compounded by the lack of information that a child or adolescent may have regarding complaint mechanisms and the institutions to which they can turn in the event of a violation, if they are unable to read or write, or if they are in a society that fails to consider their views owing to their young age, the right of access to justice and the protection thereof by States acquires particular importance.

59. In relation to children and adolescents deprived of their liberty, the Convention on the Rights of the Child enshrines the right to prompt access to legal and other appropriate assistance, and the right to a fair trial (art. 37). The Committee on the Rights of the Child has established that one of the first decisions of the State with regard to unaccompanied children and children separated from their families outside their country of origin must be the appointment of a guardian or adviser and legal representative as soon as possible, since this is the most effective mechanism for protecting the best interests of children and adolescents and ensuring access to justice.[62] Furthermore, it establishes, as an essential element, "specialized units within the police, the judiciary, the court system, the prosecutor's office, as well as specialized defenders or other representatives who provide legal ... assistance to the child".[63] When it comes to children and adolescents, access to justice must be understood from the perspective of their best interests, which requires the removal of obstacles to access to justice, including the lack of affordable and child-sensitive complaint mechanisms, technical language, mistrust of adults, and the inability to read or write.[64]

60. The Council of Europe has developed international norms and standards on migrant children in several instruments, including the 2010 Guidelines of the Committee of Ministers of the Council of Europe on child-friendly justice. The Handbook on European law relating to the rights of the child also points out the need to adapt justice to children's needs, especially if they are migrants. In 2017, the European Union Agency for Fundamental Rights compiled Agency guidelines and opinions, and testimonies of children and adolescents to build and strengthen child-friendly justice. In that regard, States must make efforts to learn about the special needs of children and their perception of justice and the institutional framework.

61. Unaccompanied migrant children face many difficulties in gaining access to justice, such as a lack of access to guardians and to legal assistance and counselling; a lack of access to information or procedures for determining the best interests of the child; and problems with age assessment procedures. The first step towards implementing laws and policies for the protection of children is their identification as minors. In spite of established standards on fair and appropriate age assessment procedures, many States resort to invasive tests (such as medical examinations or X-rays), the reliability of which is highly questionable. Furthermore, the margin of error for these tests is barely mentioned in the results, which impedes the application of the principle of the benefit of the doubt, with many migrant minors being identified as adults and detained. Moreover, there are no methods for challenging the outcomes of these proceedings. Belgium, France, Italy, Malta and Sweden are among the few

[62] See general comment No. 6 (2005) on the treatment of unaccompanied and separated children outside their country of origin.

[63] See general comment No. 10 (2007) on children's rights in juvenile justice, para. 92.

[64] See also A/72/164, A/HRC/29/26, A/HRC/25/35 and A/HRC/16/56.

countries that offer the possibility of challenging the decision or the outcome of age assessment.[65]

62. The language barrier, which prevents children from maintaining smooth communication with operators or officials, is also an important element. The African Charter on the Rights and Welfare of the Child establishes judicial safeguards for refugee children, asylum seekers, internally displaced persons and persons accused of committing crimes, noting the obligations of States to provide an interpreter and legal assistance and to explain the procedure in a language that the child understands. When these safeguards are provided for children and adolescents, they are able to gain a clear understanding of their situation, of the help they need and how to obtain it. For its part, the judicial or administrative body can clearly identify the legal issue affecting the child and thus provide timely and effective care and advice.

63. Organizations such as the United Nations Children's Fund (UNICEF) provide tailored assistance to unaccompanied migrant children through information, interpretation, legal advice, social support and family tracing and reunification. For example, in Bulgaria, UNICEF noted that unaccompanied child and adolescent migrants were being detained owing to a lack of clear procedures for identifying and assessing the child's best interests, interpreters working with the police, cooperation with the child protection system or availability of social services. The detention of such children and adolescents in Bulgaria decreased significantly in 2017 after a series of measures was adopted. These included the creation of temporary assistance facilities for children and adolescents; the adoption of an effective mechanism for the designation of a guardian and a procedure for determining the best interests of the child; referral mechanisms; safe accommodation; and a legal reform prohibiting the detention of unaccompanied children and adolescents and requiring their referral to the child protection system for child protection measures to be taken, in compliance with the applicable international norms and standards.[66]

64. Another crucial element of access to justice is training judicial and administrative officials and ensuring they acquire the necessary expertise with regard to childhood. The right to due process cannot be effectively applied without an effort to understand elements such as the progressive autonomy of children, their understanding of the world and their non-verbal language, which require special tools to be interpreted. In the inter-American system, the Inter-American Court of Human Rights has ruled on the issue[67] and has adopted the Ibero-American Protocol for Legal Action to improve access to justice for individuals and groups in vulnerable situations, with special emphasis on justice with a gender perspective, of 2014.

2. Migrant women

65. Migrant women have particular protection needs to ensure their effective access to justice in view of the sex- and gender-based discrimination they experience: they are less visible and less protected by virtue of their employment as domestic workers and in the informal sector; they experience discrimination in access to family reunification and naturalization programmes; and they are more likely than men to be detained and criminalized for their migration status.[68] The Committee on the Elimination of Discrimination against Women has noted that women workers have

[65] Submission by ICJ/ECRE.

[66] Submission by UNICEF Bulgaria.

[67] Inter-American Court of Human Rights, Advisory Opinion 17/02 of 28 August 2002 on the legal status and human rights of children, and Advisory Opinion 21/14 of 19 August 2014 on the rights and guarantees of children in the context of migration and/or in need of international protection.

[68] Submission by IOM. Centro de los Derechos del Migrante collects data on women's experiences in connection with sexual harassment and abuse through its Migrant Women Project.

limited access to justice, since they are not always eligible for free legal aid and, in some countries, they may lose their jobs for reporting harassment or abuse. The Committee therefore recommends training and awareness-raising programmes concerning the rights of women workers for State employees.

66. In the African system, the rights of women to justice and equal protection under the law are protected under article 8 of the Protocol to the African Charter on Human and Peoples' Rights on the Rights of Women in Africa, according to which States parties must ensure that women have effective access to judicial and legal services, including legal aid, and must support initiatives directed at providing women with access to legal services, including legal aid.

67. With regard to access to justice for women who are victims of sexual or gender-based violence, in accordance with the Inter-American Convention on the Prevention, Punishment and Eradication of Violence against Women (Convention of Belém do Pará), States must establish fair and effective legal procedures and ensure effective access to such procedures (art. 7). The Inter-American Court of Human Rights has identified undue delays in investigations and judicial inefficiencies in connection with cases of gender-based violence as obstacles to access to justice.[69] Migrant women face similar obstacles, given the protracted nature of administrative immigration procedures and the gender-based violence they experience in countries of origin, transit and destination.

68. Migrant women who are victims of trafficking often prefer to move on rather than seek justice to avoid the accompanying social stigma, being labelled as victims and the possibility of being traumatized anew. Women caught in the cycle of social stigma are seen not only as victims but also as having violated the community's moral code regardless of the path they choose, which is why women would often rather pretend that nothing happened and not seek redress. Consequently, one of the challenges faced by NGOs and other stakeholders that help migrant women who are victims of trafficking is convincing them that they have experienced a violation of their human rights and are entitled to redress.[70]

69. In the case of migrant women who are employed by diplomatic staff as domestic workers, the power imbalance makes them more vulnerable to exploitation and makes it harder for them to gain access to justice. In some countries, the Ministry of Foreign Affairs and NGOs have worked together to facilitate mediation. Employer participation in such mediation is voluntary, however, and authorities are reluctant to employ effective means of compelling them to take part. In that connection, the Committee on the Protection of the Rights of All Migrant Workers and Members of Their Families has recommended that States designate an ombudsperson for domestic workers to help them have access to redress mechanisms. Furthermore, the Committee encourages States to adopt time-bound or expedited legal proceedings to address complaints submitted by migrant domestic workers, and to conclude bilateral agreements to ensure that migrants have access to justice in their country of employment upon their return to their country of origin, particularly when reporting abuse or claiming unpaid wages and benefits.[71] One example of good practice is the bilateral agreement concluded between Mauritania and Saudi Arabia designed to protect Mauritanian migrant women workers in Saudi Arabia, which allows workers and employers alike to bring labour disputes to the attention of the competent authorities.[72]

[69] Inter-American Court of Human Rights, *Annual Report 2009* and *Annual Report 2014*.

[70] Submission by ILO and the judicial branch of the Government of Costa Rica.

[71] See general comment No. 1 (2011) on migrant domestic workers.

[72] Submission by IOM.

70. Sex workers, whose line of work is criminalized as well as stigmatized, constitute another group of migrant women who face particular difficulties in gaining access to justice. Furthermore, laws and policies to combat trafficking in persons are often used to identify, detain and deport undocumented migrants without providing them with either assistance or compensation.[73]

IV. Conclusions and recommendations

71. Under international law, States have a duty to protect migrants at all stages of the migratory process and to provide them with access to justice to obtain redress for any discriminatory treatment or human rights violations that they experience. Effective access to justice includes as guarantees of due process the right to legal aid and legal representation, the right to information and to an interpreter, the right to consular assistance, and access to remedies and redress. In addition, firewall protections are essential mechanisms that allow migrants to exercise their human rights without fear of being reported to the immigration authorities.

72. In practice, however, migrants face a multitude of barriers that restrict or impede their effective access to justice. This is due in large part to the fact that migration laws, policies and practices are focused on security and the deterrence and criminalization of irregular migration, which has a negative impact on the human rights of migrants. The worrying trend of detaining immigrants as a border management tool is a clear example of a practice that hinders their effective access to justice.

73. In the New York Declaration for Refugees and Migrants, States committed to combating discrimination against refugees and migrants and to take measures to improve their integration and inclusion, with particular reference to, inter alia, access to justice. The guiding principles set out in the final draft of the Global Compact for Safe, Orderly and Regular Migration agreed by States on 13 July 2018, which are fundamental to managing migration, include respect for the rule of law, due process and access to justice. Accordingly, States have committed to investing in programmes that facilitate access to justice, providing legal information and guidance to enable migrants to file complaints in cases of violations of their human rights, facilitating access to justice for victims of trafficking, and providing access to justice for all migrants subject to detention in transit and destination countries.

74. Furthermore, target 16.3 of the 2030 Agenda for Sustainable Development refers to promoting the rule of law and ensuring equal access to justice for all, which includes migrants. In this regard, the Special Rapporteur reiterates the importance of developing a 2035 agenda for facilitating human mobility, as proposed by his predecessor,[74] which would also serve as a reference for the implementation of the Global Compact on Safe, Orderly and Regular Migration. In particular, goal 5 of the agenda for facilitating human mobility refers to providing effective access to justice for all migrants.

75. In order to provide effective access to justice for all migrants, States should:

(a) Ensure equal access for migrants and provide them with reliable legal information, competent and affordable legal representation, effective legal aid, and competent translation and interpretation services; waive legal fees for all migrants who cannot afford them; and protect migrants by regularizing their

[73] Submission by Global Alliance Against Traffic in Women.

[74] A/72/173.

status, giving them special visas or taking other protective measures for victims of trafficking and forced labour;

(b) Ensure and facilitate equal and effective access for all migrants whose labour or human rights are violated to independent, competent, fair, effective and accountable judicial and quasi-judicial institutions;

(c) Ensure access for all migrants in detention, regardless of their status and circumstances, to competent lawyers, interpreters and translators, legal aid and judicial assistance programmes, NGOs, consular authorities and asylum procedures, and independent external monitoring of all migrant detention facilities;

(d) Empower migrants to avail themselves of legal remedies, and strengthen their ability to exercise influence upon law-making and law-implementing processes and institutions;

(e) End discrimination and inequalities for migrants in the legislation, policies and practices that regulate access to justice;

(f) Strengthen the capacity of courts, tribunals, national human rights institutions, ombudspersons and other mechanisms for human rights protection and dispute resolution to ensure accountability for violations of the rights of migrants;

(g) Adopt effective measures to reduce crime and violence against migrants during their journeys and in destination countries, and ensure effective protection and assistance to victims of exploitation and abuse;

(h) Establish firewalls between immigration enforcement and public services to allow access to justice for all migrants without fear of being reported, detained and deported;

(i) Ensure that labour inspections focus on employers who exploit migrant workers, rather than on the workers;

(j) Establish bilateral agreements to ensure that migrants who return to their country of origin have access to justice in the country of employment, in particular to report abuse and claim unpaid wages and benefits.

76. **With regard to migrant boys and girls States should:**

(a) Adopt and implement legislation prohibiting the detention of migrant boys and girls because of their migration status or that of their family, and adopt alternative family- and community-based measures;

(b) Facilitate access to mechanisms for submitting formal complaints and reports that are adapted to the needs of boys and girls, in cases of violations of their rights;

(c) Provide them with information — that is age-appropriate and tailored to their needs — on their rights and how to obtain redress;

(d) Give due consideration to the views of boys and girls and safeguard their privacy and confidentiality when they participate in judicial proceedings, in order to prevent their victimization or revictimization;

(e) Ensure that, as soon as possible, a legal representative is appointed for all children, free of charge, and a trained guardian is appointed for unaccompanied and separated children;

(f) Adopt effective procedures for determining children's best interests, as well as mechanisms for referral to the child protection system when necessary;

(g) Train and educate judicial and administrative officials in the human rights and needs of boys and girls.

77. **With regard to migrant women States should:**

(a) **Adopt strategies to ensure the equal access of women to justice mechanisms;**

(b) **Take appropriate measures to create supportive environments that encourage women to claim their rights, report crimes committed against them and actively participate in criminal proceedings;**

(c) **Take effective measures to protect women against secondary victimization in their interactions with law enforcement and judicial authorities;**

(d) **Review and monitor all judicial procedures to ensure that they do not directly or indirectly discriminate against women and eliminate any discrimination against women in penalties;**

(e) **Train and raise the awareness of justice system personnel regarding women's human rights and the principle of equality.**

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Item 74 (b) of the preliminary list*
Promotion and protection of human rights: human rights questions, including alternative approaches for improving the effective enjoyment of human rights and fundamental freedoms

Effects of foreign debt and other related financial obligations of States on the full enjoyment of all human rights, particularly economic, social and cultural rights

Note by the Secretary-General

The Secretary-General has the honour to transmit herewith to the General Assembly the report of the Independent Expert on the effects of foreign debt and other related international financial obligations of States on the full enjoyment of all human rights, particularly economic, social and cultural rights, Juan Pablo Bohoslavsky, submitted pursuant to Human Rights Council resolutions 25/16 and 34/3.

* A/73/50.

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Report of the Independent Expert on the effects of foreign debt and other related international financial obligations of States on the full enjoyment of all human rights, particularly economic, social and cultural rights

Impact of economic reforms and austerity measures on women's human rights

Summary

In the present report, the Independent Expert discusses the impact of economic reforms, in particular austerity and fiscal consolidation measures, on women's human rights. He argues that the prevailing current economic system is based on various forms of gender discrimination. The value of unpaid work and its contribution to the economy is, for the most part, not taken into account by mainstream economic thinking. Highlighting some economic models, the report looks into unpaid care work, which is done mostly by women, and how it underpins economic growth, unjustly absorbs economic shocks and compensates for austerity measures.

The Independent Expert offers insight into the particular channels through which economic reform policies affect women's human rights and suggests what can and should be done to prevent and address negative impacts. He argues that a human rights perspective, combined with a feminist economics analysis, can help to expose such policy biases, for which a gender-sensitive human rights impact assessment of economic reform policies is essential. Furthermore, that combination of perspective and analysis can guide policymakers in devising alternative solutions that are inclusive and advance gender equality and human rights.

A human rights approach to economic and regulatory issues should aim at addressing asymmetric power relations between men and women that are at the core of gender inequality. In that context, the report briefly discusses some elements of economic reform policies that affect the right to work, social security, housing, food, water and health. In addition, it addresses the role of the international financial institutions that, through their lending programmes, surveillance and technical assistance, prescribe macroeconomic policies that have implications for gender equality.

I. Introduction

1. The present report is a building block in the process towards the development of guiding principles for human rights impact assessments of economic policy reforms.[1] It aims at identifying gender and human rights arguments that may be crucial to the development of the guiding principles.

2. In his most recent report to the Human Rights Council (A/HRC/37/54), the Independent Expert describes the evolution in structural reform, austerity and fiscal consolidation responses to economic crises and explains how those policies affect human rights. In the light of analyses conducted in recent years indicating that those economic policies have not been gender-responsive, he argues that economic reform programmes must be gender-responsive, inclusive and advance human rights. Meeting human rights standards, which should be an essential requirement, may also have a positive impact in other respects, including economically.

3. A gender lens, embedded in the human rights impact assessment of economic reform policies, will guide States and financial institutions in considering policies to enhance substantive equality for women or, at a minimum, to avoid adverse effects on women's human rights.

4. According to some analyses, the rapid growth of economic globalization held some promise for women's human rights. However, looking back over the past 30 years, it appears that potential has not been fully realized. Where new transnational operations have been set up and created jobs for women, mostly in export processing industries and value chains, the majority of those jobs have been extremely precarious and the among worst paid and most exploitative, all while maximizing corporate profits. Women remain occupationally segregated; a systematic gender pay gap exists around the world, and millions of women face poor working conditions, low paying jobs and lack of social protection coverage.[2]

5. Austerity-related labour law reforms, including flexibilization in the labour market, often erode labour rights and result in retrogression in work-related equality measures, to the detriment of women. Upward trends in unemployment, growing work precarity and cuts to public investment in essential social services around the globe[3] have served to increase inequality and reduce prospects of economic recovery, ultimately putting the enjoyment of human rights at significant risk. Unfortunately, such trends closely follow the patterns of previous global and regional crises.

6. A decade after from the recession of 2007–2008, millions of people around the world, in particular women, continue to face significant social and economic hardship, because of both the crisis itself and the responses by Governments to it. In the immediate aftermath of the crisis, many States put in place fiscal stimulus packages and boosted social protection programmes to protect businesses and jobs and address poverty and inequality. However, in the wake of economic slowdowns and increased public deficits, there has been a global turn towards austerity, structural adjustment and fiscal consolidation.

7. Today, over two thirds of countries around the world — most of them upon the advice of international financial institutions — are contracting their public purses and

[1] The Human Rights Council, in its resolution 34/3, requested the Independent Expert to develop guiding principles for human rights impact assessments of economic reform policies.

[2] United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women), *Progress of the World's Women 2015–2016: Transforming Economies, Realizing Rights* (New York, 2015), p. 14.

[3] International Labour Organization (ILO), *World Employment and Social Outlook — Trends 2018* (Geneva, 2018).

limiting, rather than expanding, their fiscal space.[4] While structural adjustment and fiscal consolidation policies can have massive adverse impacts on the human rights of persons in situations of vulnerability, most of those policies have not been designed or implemented in a manner that would promote or safeguard human rights, let alone be sensitive to their gendered impacts.

8. Many transnational corporations are more powerful than States. Especially in times of austerity, when public services have been increasingly privatized and public-sector jobs have been cut, the power of Governments to regulate those corporations and to hold them accountable has been considerably weakened.

9. Lessons learned from responses to earlier crises regarding the importance of protecting social spending have not been applied. Sadly, the increasing emphasis on the instrumental role of human rights in improving development outcomes has not played a sufficiently explicit role in the analyses or structuring of responses by Governments and international financial institutions.[5]

10. Macroeconomic policies are most often male-biased, partially because mainstream economics is androcentric and continues to be treated as a science without a social content. Hence, zooming in on the effects of austerity on women helps not only to show that overly restrictive macroeconomic targets and spending cuts have devastating consequences on human rights, but also to understand, unravel and denounce the gender power relations that operate underneath the economic system.[6]

11. In the sphere of production, in which labour used to create exchange value in markets, women are more likely to be employed in the public sector, especially as service providers in the education and health-care fields. Women are also employed in low-paid and precarious jobs and in the informal economy. Hence, cuts in employment opportunities in both the public and private sector have sent many women into unemployment, underemployment or temporary job positions, increasing their financial insecurity, the gender employment gap and the wage gap.

12. Cuts to social services also often intensify the demand for unpaid care work, which is disproportionately carried out by women and girls (notably in poor households) and, thus, forcing them to fill the gaps. In addition, in the light of all the forms of violence and discrimination that women face, emerging evidence suggests that the burden of the crisis has been disproportionately shouldered by women owing to, inter alia, reductions in public sector employment, cuts and caps on public sector wages,[7] the phasing out of basic subsidies, cuts to social welfare services and benefits, and reforms to pensions. The impact has been particularly heavy on those who are exposed to multiple and intersecting forms of marginalization owing to economic and social status, race, sexual orientation or migrant status, among other dimensions.

13. In addition, loss of or changes to household income might also reshape the decision-making power of women, leading to less spending on goods and services

[4] Isabel Ortiz, Matthew Cummins and Kalaivani Karunanethy, "Fiscal space for social protection and the SDGs: options to expand social investments in 187 countries", ESS Working Paper No. 48 (Geneva, ILO, 2017).

[5] Juan Pablo Bohoslavsky and Kunibert Raffer, eds., *Sovereign Debt Crises: What Have We Learned?* (Cambridge, United Kingdom of Great Britain and Northern Ireland, Cambridge University Press, 2017).

[6] The Independent Expert thanks all stakeholders for their contributions to the present report, available at www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ ImpactEconomicReform PoliciesWomen.aspx. He thanks Dr.Abby Kendrick of New York University for her contribution to the report and the staff of the Office of the United Nations High Commissioner for Human Rights who work in support of the mandate.

[7] Trade Union Congress, *The Impact on Women of Recession and Austerity* (London, 2015). Available at www.tuc.org.uk/sites/default/files/WomenRecession.pdf.

that are likely to generate benefits for women and children, in particular girls. Such economic pressures may also contribute to increasing rates of domestic violence.[8] In addition, typically owing to women's unequal social and legal status, they do not have equal opportunities to begin with, and whatever may have been gained through their work is eroded when income is lost because of austerity measures.

14. In the present report, the Independent Expert offers insight into the particular channels through which economic reform policies affect women's human rights and suggests what can and should be done to prevent and address negative impacts. He argues that a human rights perspective, combined with a feminist economics analysis, can help expose the policy biases that are involved. Furthermore, this combination of perspective and analysis can guide policymakers in devising alternative solutions that are inclusive and advance gender equality and human rights.

II. Structural labour market segregation and its relationship to discrimination

15. The impacts of economic reform policies on women's human rights become clearer when analysing the development of economic policies and their link with the labour market. Such analysis is also essential to devising appropriate strategies to achieve substantive equality for women in the labour market, including access to fair and just conditions of work, and to take into account the tremendous contribution of unpaid care work to the economy and the paid workforce.[9]

16. Feminist economists have questioned the credibility of both traditional and mainstream economic thinking in general, and argue that the focus on "monetized aspects of economy" has ignored the value of unpaid care work and its economic contribution.[10]

17. Modern labour economics has considered women's work from standard neoclassical models of labour supply, which assume that each individual's optimal choices are made independent of anyone else's preferences and decisions. The unitary (and traditional) household model assumes that two individuals have the same decision-making power, thus making the household act as a single decision-making unit. That model does not take into account who controls and allocates household resources, nor does it reflect patriarchal aspects of decision-making within the household. Such models do not consider either the impact of the individual's ability or right to take part in decision-making within the household or the potential alternatives when there is no agreement.[11]

18. While some mainstream economists now use bargaining models, they still assume that the processes that govern intra-household decision-making are 'choice-based' and 'gender-neutral'. Models that do not take into account the actual imbalance in power dynamics and factors surrounding decision-making within the household will continue to perpetuate inequalities and structural discrimination. Economic policies based on models that ascribe greater worth to the productive sphere than to unpaid work also do the same.

[8] UN-Women, *The Global Economic Crisis and Gender Equality* (New York, 2014), p. 11.

[9] See for example, McKinsey Global Institute *The Power of Parity: How Advancing Women's Equality Can Add $12 Trillion to Global Growth* (2015).

[10] Shahra Razavi, *The Political and Social Economy of Care in a Development Context: Conceptual Issues, Research Questions and Policy Options*, Gender and Development Programme Paper, No. 3 (Geneva, United Nations Research Institute for Social Development, 2007).

[11] Elizabeth Katz, "The intra-household economics of voice and exit", *Feminist Economics*, vol. 3, No. 3 (1997).

19. As feminist economists have been pointing out for decades, women's unpaid work has contributed a great deal of support to the economic system. It has also absorbed the consequences of crises at various levels.[12] Responses to crises that result in cuts to public spending and care-related sectors, for instance, are likely to have an important impact on the burden of unpaid care work, as caring costs are shifted from paid work to unpaid work and from States to households. Moreover, whether during crises or not, women often perform work that "contributes to well-being and feeds into economic growth through the reproduction of a labour force (...)".[13]

20. Being that unpaid care work is defined by its contents (needs-met) or its ultimate motivation, it is clear that it goes beyond the act of caring (or wanting to care) for others in itself. The United Nations Research Institute for Social Development defines unpaid care work as, among other things, "housework (meal preparation, cleaning) and care of persons (bathing a child, watching over a frail elderly person) carried out in homes and communities".[14]

21. Unpaid care work is a major challenge affecting the expansion of female employment.[15] The absence of adequate, well-designed policies that contribute to reducing the burden of unpaid care work, such as affordable child and elderly care services, have a big impact on women's representation in the paid workforce. Many countries have continued to cut and/or privatize these services through the withdrawal of social benefits and labour protections in respect of working hours, maternity and childcare benefits, and disability benefits. As a result, responsibilities that were fulfilled and/or supported by the State increasingly fall upon the most marginalized women and girls.

22. How social reproduction[16] is organized influences the weight of unpaid care work in the economic system. Studies show that women are still responsible for more than 75 per cent of all unpaid care work done worldwide,[17] which demonstrates that the provision of social infrastructure to reduce the need for unpaid care work has been inadequate.[18] In fact, cuts in care-related social spending only add to gender-related economic inequality. More women than men are likely to be affected since they are more likely to use public services to exercise their rights in many areas, such as health-related matters, and given that their life expectancy is greater, they require service for longer periods of time.[19] They also comprise the majority of benefit recipients. Most important, women are also filling gaps in care deficits by taking up more unpaid care work at home or low-paid care work by, for instance, working as domestic workers.

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[12] Razavi, *The Political and Social Economy*, pp. 8–9.

[13] UN-Women, *The Global Economic Crisis*, p. 41.

[14] United Nations Research Institute for Social Development, *Why Care Matters for Social Development*, Research and Policy Brief, No. 9 (Geneva, 2010).

[15] Razavi, *The Political and Social Economy*, p. 1.

[16] Social reproduction refers to "the activities and attitudes, behaviours and emotions, responsibilities and relationships directly involved in the maintenance of life on a daily basis, and intergenerationally. Among other things, social reproduction includes how food, clothing, and shelter are made available for immediate consumption, the ways in which the care and socialization of children are provided, the care of the infirm and elderly, and the social organization of sexuality"... Barbara Laslett and Johanna Brenner, "Gender and social reproduction: historical perspectives", *Annual Review of Sociology*, vol. 15 (1989), pp. 382–383.

[17] ILO, *Care Work and Care Jobs for the Future of Decent Work* (Geneva, 2018), p. 53.

[18] Diane Elson, "A gender-equitable macroeconomic framework for Europe", in Hannah Bargawi, Giovanni Cozzi and Susan Himmelweit eds., *Economics and Austerity in Europe: Gendered Impacts and Sustainable Alternatives* (Abingdon, United Kingdom, Routledge, 2017), p. 16.

[19] See the submission by the Committee for the Abolition of Illegitimate Debt to the Independent Expert. Available at https://www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ImpactEconomicReformPoliciesWomen.aspx.

23. In sum, in assessing the impact of economic reform policies on women's human rights, specific attention should be paid to the factors affecting women's access to decent work and productive resources and to the extent of their contributions in terms of unpaid work. That, in turn, requires the consideration of the division of labour within the household and the impacts of unpaid work outside that sphere.

III. The impact of austerity-driven policies on women's human rights

24. Ingrained economic, social and cultural discriminatory practices, stereotypes and norms targeting women can often mean that women have fewer resources and enjoy less security and safety than men. That is particularly evident when considering the broad range of stigma and stereotypes that women face throughout the various stages of their lives. It also becomes apparent when analysing the labour market and, in particular, the distribution of unpaid care work, occupational segregation, discrimination in the workplace and the gender pay gap.

25. Economic crises affect women in a disproportionate manner, not only because crises affect specific human rights, but also because the State and society as a whole tend to rely even more on women's unpaid care work to make up for the lack of or reductions in public services. Such effects are also more visible given that women, who face entrenched discrimination, inequality and power imbalances, tend to make use of safety nets provided by the State more often than men.

26. In some regions, the triple jeopardy of austerity, which sees women suffer simultaneously as public-sector workers, service users and the main recipients of social security protection benefits, has specific implications in terms of care. That in turn aggravates labour market gender discrimination and occupational segregation. Cuts to social care have reduced access to many crucial services. Loss of jobs within the care sector and public sector pay freezes have also affected women.

27. Such affects vary considerably depending on the context. In a world where only 27 per cent of the population enjoys full access to social protection,[20] many women do not have access to any social protection. Women tend to be overrepresented among the remaining 73 per cent who either lack coverage or are only partially covered. Adequate social protection provided by States is not only required to level the playing field between women and men but also to ensure that women have access to services and income in order to realize their basic human rights.

28. Emerging evidence suggests that women who are already facing the greatest disadvantages are also those who are most affected by cuts in areas touching on a wide range of human rights. For instance, in the United Kingdom of Great Britain and Northern Ireland, long before the latest crisis took hold, women who belong to minorities had been statistically more likely to be employed in the public sector as teachers, nurses and social workers. They had also been more likely to work for State entities through private-sector subcontractors as care workers, cleaners, caterers, etc., and, owing to their disproportionately high burden of care-giver responsibilities, have also been more likely to be connected to the State at the local level through their use of public services, all of which have come under focused attack through austerity cuts.[21]

[20] UN-Women, *Progress of the World's Women 2015–2016*, p. 15.

[21] Akwugo Emejulu and Leah Bassel, "Minority women, austerity and activism", *Race and Class*, vol. 57, No. 2 (October–December 2015).

29. It is important to keep in mind the diversity of women, as they cannot be seen as a monolithic group. The experiences of women in different social groups are unique, and those who suffer the most from financial crises and their aftermath are often the ones who are least involved in their making. Given that women are more likely to live in poverty, changes to and reductions in benefits and public spending hit the most exposed and marginalized groups of women harder. That highlights the cumulative impacts of multi-layered discrimination on women's human rights.

30. Women and girls experience those impacts differently throughout their lives, hence the importance of a life-cycle approach to addressing those impacts (see A/HRC/26/39). Social security and pension cuts, for example, may affect older women in particular. Cuts in subsidies for education and those that affect basic services, housing, transportation and food can push girls and single mothers out of school and may engender specific negative consequences for younger women. Cuts in childcare services pose major obstacles to women's equal participation in higher education, for example. The Committee on the Elimination of Discrimination against Women has emphasized that "privatization has specific negative consequences for girls and women and in particular girls from lower income households, namely, their exclusion from education".[22] Often, parents who cannot afford to send all their children to school will prioritize sending their boys.

The impact on women's right to work

31. The economic crisis in 2007–2008 had major effects on unemployment for both men and women around the world. However, the timing of those effects has taken on a gendered trend given occupational segregation. Job losses affected industries that were sensitive to falling output, such as the manufacturing and construction sectors, which, depending on the geographical context, are sectors dominated by men (for example, construction in industrialized countries) or by women (for example, manufacturing in some developing countries).[23] In industrialized countries,[24] sectors that are generally dominated by men recovered faster owing, in large part, to the targeting of fiscal stimulus programmes towards industries that had initially been most affected. In a later phase, characterized by widespread austerity, fiscal consolidation and labour market reforms, women's employment, which was disproportionately concentrated in the public sector and other sectors that were more sensitive to such measures, was more greatly affected.

32. Outside the public sector, economic reforms implemented in the global South following the crisis have affected women's work in distinct ways. For example, in the agricultural sector, the removal of agricultural subsidies has increased the price of staple foods. Combined with trade liberalization policies and currency devaluation, the increase in the cost of imported staples and agricultural products such as fertilizer have priced local producers — most often women — out of the market and out of jobs.

33. Owing to the significance of remittances by migrant workers to their countries of origin, Governments in those countries have promoted the employment of women abroad as domestic workers, even though in many cases the women work in slavery-like conditions. This is part of the so-called global care chains that appear when the State does not provide public care services; many women can engage in paid

[22] Committee on the Elimination of Discrimination against Women, general recommendation No. 36 (2017) on the right of girls and women to education.

[23] UN-Women, *The Global Economic Crisis*, p. 4.

[24] Maria Karamessini and Jill Rubery, eds., *Women and Austerity: The Economic Crisis and the Future of Gender Equality* (Abingdon, Routledge, 2014).

employment only if they pay other women — usually from lower income brackets — to take over their care responsibilities.

34. In turn, important cuts to employment also affect remittance flows of migrants, who are "recognized as providing essential support to households in many low- and medium-income countries".[25] Job losses particularly affecting female-dominated sectors such as domestic work or exportation-led fields may have further repercussions for the ability of women workers to provide such economic support.

35. A related phenomenon is the often-seen increase in women's participation in the labour market during economic crises, arising from the need to supplement household income. However, the increase is mainly seen in the informal sector. According to the United Nations Entity for Gender Equality and the Empowerment of Women, more than 80, 74 and 54 per cent of all women employed in non-agricultural jobs in South Asia, sub-Saharan Africa and Latin America and the Caribbean, respectively, are employed in the informal sector.[26] Women and girls are more likely to be working under hazardous conditions and at the lowest levels of transnational corporation value chains, sometimes as intergenerational bonded labourers, and are vulnerable to sexual exploitation and other types of abuse. In such contexts, where women often have no recourse but to engage in riskier work, violations of labour standards are less apparent and those women are more likely to be rendered invisible.

36. Reforms that result in a reduction in the percentage of workers covered by collective bargaining arrangements also exacerbate gender pay gaps. Evidence shows that collective bargaining arrangements play an important role in reducing employer discretion and gender pay gaps.[27] Studies have demonstrated that countries with collective bargaining coverage of 80 percent or greater have narrower gender pay gaps.[28]

37. Women tend to be overrepresented in low-paid work, with inadequate minimum wages contributing to the gender pay gap and to working women's poverty.[29] The 2014, a general survey on minimum wage systems conducted by the International Labour Organization (ILO) noted that minimum wages do not necessarily constitute a living wage since they do not ensure adequate livelihoods for workers and their families.[30] Moreover, in some countries, minimum wages have been reduced as part of austerity measures, or have not been adjusted to take into account inflation and the real cost of living, leading to a reduction in their real value over time.[31]

The impact on women's right to social security

38. In some countries, the breakdown of social protection systems has had an impact on women's right to social security in many ways, including through reductions in

[25] Jane Lethbridge, "Impact of the global economic crisis and austerity measures on women", report commissioned by Public Services International, May 2012, p. 20.

[26] See www.unwomen.org/en/news/in-focus/csw61/women-in-informal-economy.

[27] ILO, *Reducing Inequalities in Europe: How Industrial Relations and Labour Policies Can Close the Gap* (Geneva, 2018).

[28] See for example, Jill Rubery and Damian Grimshaw, "Gender and the minimum wage", in ILO, *Regulating for Decent Work: New Directions in Labour Market Regulation* (London, Palgrave, 2011).

[29] Labour 20 Argentina, "Economic and social policy brief: the case for wage-led growth", 20 April 2018.

[30] ILO, *General Survey of the Reports on the Minimum Wage Fixing Convention, 1970 (No. 131), and the Minimum Wage Fixing Recommendation 1970 (No. 135)*, ILC.103/III/1B (Geneva, 2014).

[31] International Trade Union Confederation, "International Trade Union Confederation 2017 global poll", 2018; Labour 20 Argentina, "Economic and social policy brief: the case for wage-led growth", 20 April 2018.

various unemployment, social, family and maternity benefits and in aid to the elderly and to dependent persons.

39. The situation is worse for women who experience multiple and intersecting forms of discrimination owing to their socioeconomic status, age, race, sexual orientation or migrant status, among other dimensions. For example, single mothers and members of minority groups are more likely to be affected by cuts to benefits and tax credits because they are more likely to be living in poverty, with dependent children and in large families, adding to the burdens facing those marginalized groups.[32]

40. Those effects are more severe when considered alongside other institutional reforms. In Spain, for instance, following European Commission guidelines,[33] access to pensions and social security is increasingly being tied to work-related criteria, with payments more likely to depend on the amount of contributions made over a worker's entire career.[34] In effect, the more someone works and contributes through salary deductions, the more protection and entitlements they will receive upon retirement. Such forms of social protection schemes lead to exclusion and the erosion of the solidarity-based human rights principle of social protection and marginalize women from the very beginning, given that they generally have more breaks and interruptions in their work history and are paid less over the course of their careers because of gender wage discrimination.

41. In addition, reforms adopted in response to economic shocks may lead to a reduction of universal benefits and a narrowing of cash transfers programmes. The total impact of cuts to social security on women's human rights is therefore multiplicative.

The impact on women's right to housing, water and food

42. The impacts of austerity measures on women's right to housing are multiple, ranging from evictions, to rental price hikes, reductions in social housing, the growth of informal settlements and in subletting. Privatization and deregulation of the housing market in reaction to economic crises have affected women in a particular manner, exacerbating the challenges they face in gaining access to adequate housing (see A/HRC/19/53). In addition, spending cuts can also touch specific programmes such as those providing social housing or those aiming at preventing and combating violence against women through providing shelter to escape domestic violence. The closing of those shelters, which constitute alternative housing, may put women at greater risk of violence and contribute to the occurrence of homelessness and poverty.

43. Land policy also can negatively affect women in similar ways. That is particularly worrying for various reasons. The lack of security of tenure over land used to sustain livelihoods has important implications for the enjoyment of the right to food and housing, especially in terms of access and availability, while also putting those women at risk of eviction and dispossession. One of the results of economic reforms and rising food and fuel prices has been an increase in large-scale land acquisitions. Because women make up the majority of the world's small farmers, such

[32] See the submission of the Women's Budget Group to the Independent Expert. Available at https://www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ImpactEconomicReformPoliciesWomen.aspx.

[33] European Commission, "Non-standard employment and access to social security benefits", research note 8/2015, January 2016.

[34] Núria Pumar Beltrán, "Mainstreaming gender in Spanish labour and pension reforms and in European social policies", in Beth Goldblatt and Lucie Lamarche, eds., *Women's Rights to Social Security and Social Protection* (Portland, Oregon, Hart Publishing, 2014).

acquisitions make their situation even more precarious, either further depriving them of access to land or making their rights over land less secure.[35]

44. Privatization of and under-investment in water infrastructure and water services have important impacts on women. For example, it could mean that people must go to public wells to collect water. The privatization of pipeline services may restrict their extension because such extensions may be deemed not to be profitable. Bearing in mind that in many poor communities, where fetching water is a task that "overwhelmingly falls to women and girls" (see A/HRC/24/44), the impact of privatization and under-investment has important consequences in terms of the time allocated by women to unpaid work. Moreover, the fetching of water forces many girls to abandon their schooling, may affect their health (since the weight of water being carried often on the head can cause back and neck pains), and exposes them to the risk of violence that is often present on the journey, especially if the journey is to a river or a waterhole.

45. Accessibility, affordability and availability of food are critical aspects of women's enjoyment of their right to food. The loss of household income, triggered by austerity, may have a negative impact on the quality and quantity of food purchased, as observed in Eastern Europe and Central Asia.[36] Poor households, especially those headed by women, spend a larger proportion of the family budget on food. That can trigger negative coping mechanisms. In the face of a loss in household income, child malnutrition could also ensue. If the gender norm in a particular context is one of strong preference for consumption for sons, then it is likely that girls will be more negatively affected than boys in situations of food scarcity. Women with children and older persons may often reduce their protein intake in favour of other type of intake, which, in turn, may endanger their health.

The impact on women's right to health

46. Cuts to health-care budgets affect both men and women. However, negative effects on women are likely to be disproportionate because women use health-care services largely owing to gender-specific needs and disadvantage induced by economic system.[37] Not only can cuts affect women as users and workers but they also may impose additional burdens. Spending cuts affecting the level of service provided or the amount of time spent in the hospital may have great impacts on caregivers and on unpaid care work as a whole. In this context, caring for sick people may often by handled by relatives, who are likely to be women.

47. Many countries have seen cuts to women-specific health services. In the Democratic Republic of the Congo, the de facto privatization of health-care services has meant that pregnant women must provide evidence that they can pay for pre-natal and maternity care in order to receive it and, if they cannot afford to pay, may be held hostage after giving birth until payment is made.[38] That may create disincentives for women in seeking appropriate, safe maternal and neonatal care, increasing the risk maternal and neonatal death and negatively affecting women's health and sexual and reproductive rights in fundamental ways.

[35] Committee on the Elimination of Discrimination against Women, general recommendation No. 34 (2016) on the rights of rural women, para. 62 (c).

[36] Lethbridge, "Impact of the global economic crisis", p. 5.

[37] Kate Donald and Nicholas Lusiani, "The gendered costs of austerity: assessing the IMF's role in budget cuts which threaten women's rights", September 2017. Available at www.brettonwoodsproject.org/wp-content/uploads/2017/09/The-IMF-Gender-Equality-and-Expenditure-Policy-CESR-and-BWP-Sept-2017.pdf.

[38] See the submission of the Committee for the Abolition of Illegitimate Debt to the Independent Expert.

48. Again, the total impact of cuts to care services on women's human rights is multidimensional. In Ukraine, for example, in addition to cutting 25,000 health-care jobs, reducing the number of hospital beds, and, in some cases forcing hospitals to close, [39] the Government has also cancelled fuel subsidies. That will disproportionately affect rural residents (who comprise one third of the total population of Ukraine), in particular rural women, since they are already disadvantaged with respect to work, health and physical security when compared with women in urban areas and with men.

49. Austerity can affect women's reproductive health in particular and cause irreparable harm. For instance, adjustment measures often result in direct cuts to contraceptive supplies in the public sector, which has been found to contribute directly to an increase in unintended pregnancy and spiralling rates of maternal mortality. It can also trigger a rise in unsafe abortion.

The impact on violence against women

50. Violence faced by women and girls in its various forms contributes to the perpetuation of stigma and stereotypes, while reinforcing economic exploitation in a cyclical way that potentially results in less decision-making power, education and control over resources, thereby limits their opportunities. It also increases their exposure to economic exploitation [40] and other forms of gender-based violence. Women facing multiple and intersecting forms of discrimination face higher risks violence in public and private spheres and have limited access to justice. Austerity measures and associated spending cuts may lead to the weakening of the State's response[41] to violence, with important implications in terms of access to justice for victims.

51. Moreover, unemployment and poverty force many women, including young girls, into prostitution.[42] It also provides fertile ground for the trafficking of women for the purposes of sexual exploitation, forced marriage or recruitment of women as domestic workers in other countries.

52. In Brazil, for example, Constitutional Amendment No. 95, which froze public spending for 20 years, has meant that no new women's shelters have been built since 2017. Brazil currently has one of the highest rates of feminicide in the world[43] and has recently experience a significant increase in violence against women. [44]

53. In Cambodia, export-led growth strategies have exposed women to exploitation and violence in and around the workplace. Similar liberalization reforms have increased the percentage of women who resort to informal employment in India,

[39] Women's International League for Peace and Freedom and others, "Obstacles to women's meaningful participation in peace efforts in Ukraine: impact of austerity measures and stigmatization of organizations working for dialogue", joint submission to the Universal Periodic Review of Ukraine, March 2017. Available at: https://wilpf.org/wp-content/uploads/2017/04/UKRAINE_UPR_JointSubmission_30-Mar-2017.pdf.

[40] ActionAid, "Double jeopardy: violence against women and economic inequality", March 2017.

[41] Committee on the Elimination of Discrimination against Women, general recommendation No. 35 (2017) on gender-based violence against women, updating general recommendation No. 19.

[42] Ibid., general recommendation No. 19 (1992) on violence against women.

[43] World Bank, "What does it mean to be a woman in Brazil? The answer will surprise you", 8 March 2017. Available at www.worldbank.org/en/news/feature/2017/03/08/ser-mujer-brasil.

[44] See the submission of the Bretton Woods Project to the Independent Expert. Available at https://www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ImpactEconomicReformPoliciesWomen.aspx.

which has left poorer women economically marginalized and exposed to violence.[45] In addition, some workers cannot exercise their rights to freedom of association and collective bargaining, owing to the inappropriate use of contractual arrangements, with important implications in terms of the right to work and the misuse of the self-employment designation. This also has the potential to increase the risk of violence and harassment in the workplace,[46] which is particularly worrying given the ever-growing body of evidence of sexual harassment, violence, forced pregnancy testing, forced abortions and unlawful detention of young women who work for companies linked to global supply chains.

Tax (in)justice and discrimination against women

54. Austerity measures may result from the failure to mobilize maximum available resources owing to reductions in income and corporate tax rates. To balance the loss in revenue from such sources, some Governments have increased the value-added tax (VAT) levied on consumer goods and services. Since women are often responsible for buying food, clothes and general household goods, regressive tax measures, such as increases in VAT and other sales taxes, further shrink women's available income and reduce their purchasing power. In addition, although certain States have paid specific attention to the issue,[47] essential sanitary products for women carry high VAT rates in many countries. The fact that 93 developing countries are considering raising VAT has particularly troubling implications for the livelihoods of women, especially those who are living in poverty,[48] since it will most heavily affect women and increase reproduce inequality, all while failing to substitute for the revenue that is lost through tax dodging and avoidance.

55. Progressive tax regimes play a key role in the mobilization of the maximum of available resources to effectively tackle discrimination against women and provide free, high-quality gender-responsive public services to women. That includes an emphasis on the direct taxation of income, capital gains, wealth and high net worth individuals, and on ensuring that multinational corporations pay their fair share, while reducing reliance on flat rate VAT and sales taxes and curbing illicit financial flows[49] especially tax evasion and avoidance. Corporate income tax revenues are also an important aspect. For instance, a study has estimated that, for the garment and textile sector in Viet Nam, such revenue could amount to $40 million per year, or around 0.1 per cent of the country's total tax revenues (based on 2012 data).[50]

56. It is also necessary to highlight the concrete implications of tax injustice for women and their enjoyment of human rights. In general terms, women are underrepresented among high-income individuals and financial asset holders.

[45] See the submission of ActionAid to the Independent Expert. Available at https://www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ImpactEconomicReformPoliciesWomen.aspx.

[46] ILO, *Meeting of Experts on Violence against Women and Men in the World of Work* (Geneva, 2017).

[47] See the submission of Mauritius to the Independent Expert. Available at https://www.ohchr.org/EN/Issues/Development/IEDebt/Pages/ImpactEconomicReformPoliciesWomen.aspx.

[48] Isabel Ortiz and others, *The Decade of Adjustment: A Review of Austerity Trends 2010–2020 in 187 Countries*, ESS Working Paper No. 53 (Geneva, ILO, 2017), p. 13.

[49] Attiya Waris, "Illicit financial flows: why we should claim these resources for gender, economic and social justice", 2017.

[50] Action Aid and Aid for Social Protection Program Foundation Viet Nam, "Stitching a better future: is Viet Nam's boom in garment manufacturing good for women?", November 2017, p. 5.

IV. Relevant standards on women's human rights in the economic sphere

A. Pertinent international human rights standards on women

57. Non-discrimination and equality between men and women are cornerstones of all core international human rights conventions and of regional human rights instruments and most national Constitutions. In the present section, the Independent Expert will briefly outline some pertinent key standards set out in the Convention on the Elimination of All Forms of Discrimination against Women and the International Covenant on Economic, Social and Cultural Rights.

58. Articles 2 and 3 of the Convention on the Elimination of All Forms of Discrimination against Women enshrine the obligation of States parties "to pursue by all appropriate means and without delay a policy of eliminating discrimination against women". The Convention requires States parties to take all appropriate measures, including legislation, to guarantee women the exercise and enjoyment of all human rights on a basis of equality with men. Article 4 recognizes that potential temporary special measures are also required with the view to eliminating discrimination and achieving formal and substantive equality. The Committee on the Elimination of Discrimination against Women has clarified that those measures should aim to accelerate the achievement of gender equality and address "the structural, social and cultural changes necessary to correct past and current forms and effects of discrimination against women, as well as to provide them with compensation".[51]

59. The Committee on the Elimination of Discrimination against Women has explicitly addressed economic policy reforms a number of times. It has called upon States to mobilize sufficient resources to ensure the realization of women's human rights and to eliminate discrimination.[52] It has underlined that "even in times of fiscal constraints and economic crisis, special efforts must be made to respect women's human rights, sustain and expand social investment and social protection and employ a gender-sensitive approach, giving priority to women in vulnerable situations" (see CEDAW/C/GRC/CO/7). It has called upon States to ensure that any response to financial crises incorporates a gender perspective and that sufficient funds are allocated to address or mitigate the severe negative impacts of austerity measures on the lives of women and their access to health-care services specifically (see CEDAW/C/BRB/CO/5-8).

60. Articles 2.2 and 3 of the International Covenant on Economic, Social and Cultural Rights are integrally related and mutually reinforcing with respect to ensuring equality and non-discrimination for women with regard to all human rights as set out the Covenant. As underlined in the Covenant, equality between men and women is a crosscutting obligation.

61. In this context, the Committee on Economic, Social and Cultural Rights, in its general comment No. 16, stressed that States should ensure that, in practice, men and women enjoy their economic, social and cultural rights on a basis of equality. To that end, States should address gender-based social and cultural prejudices, enhance equality in the allocation of resources, and promote the sharing of responsibilities in the family, community and public life. Equality between men and women, and the elimination of discrimination based on sex, should be addressed both formally and

[51] Committee on the Elimination of Discrimination against Women, general recommendation No. 25 (2004) on temporary special measures.

[52] See, for example, Committee on the Elimination of Discrimination against Women, general recommendation No. 24 (1999) on women and health, para. 30.

substantively. In addition to taking positive action to eliminate prejudices or practices that perpetuate inequality, States should refrain from adopting direct or indirect discriminatory practices and measures.

62. The International Covenant on Economic, Social and Cultural Rights establishes two types of obligations for States parties: (a) obligations with immediate effect, notably the elimination of discrimination; and (b) the obligation to ensure the progressive realization of economic, social and cultural rights by making use of the maximum of their available resources.[53] That is, eliminating discrimination based on sex is not only an obligation of an immediate nature but also a non-derogable engagement of all States parties to the Covenant. As stated by the Committee on Economic, Social and Cultural Rights, "any deliberately retrogressive measures in that regard would require the most careful consideration and would need to be fully justified by reference to the totality of the rights provided for in the Covenant and in the context of the full use of the maximum of available resources".[54]

63. A range of International Labour Organization conventions promote gender equality at work, including Convention No. 100 (on equal remuneration); No. 111 (on discrimination in employment and occupation); No. 156 (on workers with family responsibilities); No. 183 (on maternity protection); and No. 189 (on the rights of domestic workers).[55]

64. In relation to transnational corporations and other business enterprises, the Guiding Principles on Business and Human Rights, in particular principles 12 and 18.1 therein, also provide guidance that is pertinent to gender equality.[56]

B. General limits to austerity and impermissible retrogression

65. At all times, States have the discretion to select and adopt policies according to their own needs and views. However, when adjustment and austerity measures are under discussion, specific substantive and procedural human rights obligations must be met.[57] The same applies to financial institutions that make policy recommendations to borrowing States.[58]

66. A crucial obligation of States parties under the International Covenant on Economic, Social and Cultural Rights is to take steps to the maximum of their available resources to ensure the progressive realization of rights. Such steps need to be deliberate, concrete and targeted and aim at the fulfilment of rights. Even in times of economic crises, States have to demonstrate that every effort has been made to comply with that obligation, including by creating additional fiscal space such as

[53] Committee on Economic, Social and Cultural Rights, general comment No. 3 (1990) on the nature of States parties' obligations.

[54] Ibid.

[55] See www.ilo.org/gender/Aboutus/ILOandGenderEquality/lang--en/index.htm.

[56] See A/HRC/17/31; endorsed by Human Rights Council resolution 17/4 of 6 July 2011.

[57] See Committee on Economic, Social and Cultural Rights, general comment No. 19 (2007) on the right to social security, and letter dated 16 May 2012 by the Chairperson of the Committee on Economic, Social and Cultural Rights to State parties.

[58] *Interpretation of the Agreement of 25 March 1951 between the WHO and Egypt, Advisory Opinion, I.C.J. Reports 1980*, p. 73, para. 37; E/C.12/2016/1, paras. 7–9; and Committee on Economic, Social and Cultural Rights, general comment No. 2 (1990) on international technical assistance measures, para. 9.

through the levying of taxes to support social transfers to mitigate inequalities that can grow in times of crisis.[57]

67. The keystone standard for the evaluation of economic reforms is the prohibition of retrogression in the realization of economic, social and cultural rights. As stated by the Committee on Economic, Social and Cultural Rights, taking steps that would reduce the enjoyment of those rights is permissible only if States can prove that such retrogressive measures are:[58]

(a) Temporary: only remain in place when necessary;

(b) Legitimate: the ultimate aim is to protect the totality of human rights;

(c) Reasonable: the means chosen are the most suitable and capable of achieving the legitimate aim;

(d) Necessary: the means are deemed justifiable upon the most careful consideration of all other less restrictive alternatives;

(e) Proportionate: the adoption of any other policy or failure to act would be more detrimental to the enjoyment of economic, social and cultural rights;

(f) Non-discriminatory and have the ability to mitigate the inequalities that can emerge in times of crisis; and they ensure that the rights of disadvantaged and marginalized individuals and groups are not disproportionately affected;

(g) Protective of the minimum core content of economic, social and cultural rights; and they are based on transparency and the genuine participation of affected groups in examining the proposed measures and alternatives;

(h) Subject to meaningful review and accountability procedures.

V. International financial institutions and their gender impact approach

68. International financial institutions are mandated to promote economic growth and financial stability, and are often seen to be at the apex of the global economic order.[61] Through lending programmes, surveillance and technical assistance, international financial institutions prescribe macroeconomic policies with obvious implications for gender equality and human rights.

69. In that regard, IMF acknowledges that its emphasis on the importance of achieving inclusive sustainable economic growth leads its work to support policies that provide a foundation for the exercise and enjoyment of human rights.[62] Through its surveillance work, IMF is well-positioned to promote policies that have a positive gender impact. It has actually referred to the importance of addressing gender inequality in international and national economic policies, and it has recently taken stock of gender budgeting and practices in several countries.[63] In fact, IMF has been

[59] Committee on Economic, Social and Cultural Rights, general comment No. 24 (2017) on State obligations under the International Covenant on Economic, Social and Cultural Rights in the context of business activities, para. 23.

[60] See E/C.12/2016/1; Committee on Economic, Social and Cultural Rights, general comment No. 19 (2007), para. 42; A/HRC/37/54.

[61] Bretton Woods Project, *The IMF and Gender Equality: A Compendium of Feminist Macroeconomic Critiques* (London, 2017). Available at www.brettonwoodsproject.org/wp-content/uploads/2017/10/The-IMF-and-Gender-Equality-A-Compendium-of-Feminist-Macroeconomic-Critiques.pdf.

[62] International Monetary Fund (IMF) comments on the present report, 13 July 2018.

[63] Lisa Kolovich, *Fiscal Policies and Gender Equality* (Washington, D.C., IMF, 2018).

promoting gender budgeting as an effective way to use fiscal policies to address gender inequality. Some of that work has provided the basis for policy advice and technical assistance in countries such as Argentina, Austria, Bahrain and the Islamic Republic of Iran.[64] It has also examined the removal of tax policies that have discriminatory impacts on women.[65]

70. Gender equality can be justified on intrinsic grounds, as a goal in and of itself, which speaks to the human rights-based arguments under discussion in the present report. However, gender equality can also be justified on instrumental grounds, that is, as a means to achieve economic growth and development goals. The recent focus of IMF, along with the approach adopted by a number of States, appears to be mostly instrumental. That approach can present serious conflicts with the intrinsic importance of gender equality as a key component of human rights standards, in particular in the light of the economic policies proposed and promoted by international financial institutions in recent years.

71. Some research shows that securing certain human rights is good for growth and for the distribution of its benefits.[66] However, there is no conclusive evidence to show that gender equality is always good for growth. In fact, some evidence shows that gender inequality can be conducive to some forms of economic growth.[67]

72. If Governments actually ensure that the fruits of growth are fairly distributed, instrumental justifications could complement the intrinsic human rights-based arguments. That distribution could be achieved through a number of measures, such as the provision of financial incentives, social services, technology and infrastructure, the collection of adequate revenues and the creation of economic opportunities for all.

73. The effectiveness of the approach of international financial institutions to gender inequality raises important questions when it comes to reducing the coverage of social protection benefits, fiscal space for social services and investments in infrastructure that are sustainable and gender-responsive. Not addressing structural barriers to women's enjoyment of economic and social rights and remaining silent about the impacts of illicit financial flows, regressive tax regimes and austerity measures on women's human rights also raises important considerations in that sense.

74. The work of IMF is largely centred on how closing gender gaps in labour force participation can have positive growth effects. While it might be the case that a specific policy that encourages women to enter into the paid labour force is good for growth, if entry is not on equal terms with men, it could lead to the reinforcement of gender inequality.

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[64] IMF, "How to operationalize gender issues in country work", policy paper (Washington, D.C., IMF, 2018), p. 7. Available from www.imf.org/en/Publications/Policy-Papers/Issues/2018/06/13/pp060118howto-note-on-gender.

[65] See for example, IMF, "Morocco: 2016 article IV consultation", IMF Country Report No. 17/36, February 2017.

[66] See for example, Sigrid Alexandra Koob, Stinne Skriver Jørgensen and Hans-Otto Sano, *Human Rights and Economic Growth: An Econometric Analysis of Freedom and Participant Rights* (Copenhagen, Danish Institute for Human Rights, 2017).

[67] To capture the full extent of gender equality's contribution to growth, human resource aggregates of the reproductive economy need to be included; Aniruddha Mitra, James T. Bang and Arnab Biswas, "Gender equality and economic growth: is it equality of opportunity or equality of outcomes?", *Feminist Economics*, vol. 21, No. 1 (2015); Katrin Elborgh-Woytek and others, "Women, work, and the economy: macroeconomic gains from gender equity", Staff Discussion Note 13/10 (Washington, D.C., IMF, 2013); Alison Vásconez Rodríguez "Economic growth and gender inequality: an analysis of panel data for five Latin America countries", *CEPAL Review* (August 2017). Available from: https://www.cepal.org/en/publications/42660-economic-growth-and-gender-inequality-analysis-panel-data-five-latin-american.

75. It seems that IMF is neglecting both the potential of gender inequality under certain conditions to stimulate growth and the macroeconomic and institutional enabling conditions that foster gender equality.[68] At the very least, IMF should engage in research into those policies that deliberately make use of women's cheap labour to grow the economy and gain a competitive advantage, which ultimately create the very structures that maintain and exacerbate discrimination and inequality rather than alleviate them.

76. While the gender strategy of the World Bank Group for the period 2016–2023 takes into account barriers to women's economic participation, some argue, however, that a more comprehensive understanding of women's economic empowerment in work-related areas would be needed to achieve substantive equality.[69] For example, Cambodia has seen impressive growth in recent years, and its garment industry, whose labour force is composed almost entirely of women workers, has largely been responsible, accounting for a massive 80 per cent of Cambodia's total export earnings. At the same time, however, the gender wage gap in the county more than doubled between 2004 and 2009.[70]

77. The structural adjustment programmes of IMF and the World Bank Group have historically been the object of even greater criticism for imposing harsh austerity measures that have significantly and disproportionately impacted the poor and exacerbated inequality, including gender inequality. As recently as 2018, IMF has been prescribing policies that undermine gender equality and the fulfilment of women's human rights. Some of those prescriptions include reducing food subsidies, privatizing public utilities, downsizing social safety nets and lowering public wages, along with labour deregulation, reductions in pensions, public service cuts and regressive tax regimes through the introduction of or increases in VAT while reducing corporate tax rates.[71]

VI. Conclusions

78. The current economic system is, for the most part, sustained by gender inequality and discrimination against women in the labour market. Of the various forms of inequality, women's unpaid care work is a crucial and yet often neglected consideration in the design of policies and economic reforms. A human rights approach to economic issues should endeavour to address the asymmetric power relations that underpin gender inequality.

79. Mainstream economic thinking does not take into account the value of domestic and unpaid care work and its contribution to the economy. Women carry out the bulk of that work, which underpins economic growth. In addition, unpaid work unjustly absorbs economic shocks and often compensates for austerity measures. The disproportionate burden of unpaid work on women and girls constitutes an important barrier to their gaining access to the right to work.

80. Austerity hits women harder. Most women are already confronting a range of structural inequalities, including pay gaps, occupational segregation, informality, precarious jobs, unemployment, lack of access to and control over land, credit and other productive resources, and the heavy burden of unpaid work. In addition, many

[68] Günseli Berik, "Beyond the rhetoric of gender equality at the World Bank and the IMF", *Canadian Journal of Development Studies*, vol. 38, No. 4 (2017).

[69] See Bretton Woods Project, "World Bank releases new gender strategy", 9 February 2016. Available at www.brettonwoodsproject.org/2016/02/world-bank-releases-gender-strategy/.

[70] ActionAid, "Close the gap! The cost of inequality in women's work", January 2015. Available at www.actionaid.org.uk/sites/default/files/publications/womens_rights_on-line_version_2.1.pdf.

[71] Bretton Woods Project, *The IMF and Gender Equality*.

women also face discriminatory norms, gender stereotypes and various forms of violence. In addition, women are often underrepresented in politics and decision-making, and may have fewer opportunities to participate in decisions that directly or indirectly affect their living conditions and those of their families and communities. In some cases, owing to their economic disadvantages or specific needs, many women tend to use the employment, health and education services provided by the public sector. Often, women also depend on social transfers, social housing and utility subsidies, along with disability benefits and child benefits, or, in the case of women living in poverty, cash transfers and in-kind transfers.

81. Hence, austerity-driven fiscal consolidation measures and economic reforms, such as those encouraging labour market flexibilization reductions in the coverage of social protection benefits and services, cuts to public-sector jobs, and the privatization of services, tend to negatively affect women more than men (the so-called triple jeopardy). Instead of creating such situations, which can often constitute discrimination, State policies should focus on their prevention.

82. Austerity and fiscal consolidation policies hit the most vulnerable groups within a given population, among whom women are overrepresented and the most exposed, giving rise to intersecting forms of discrimination. Among the women who are most exposed are single mothers, young women, women with disabilities, older women, refugee and migrant women, lesbian, bisexual, transgender and intersex women, those women who belong to ethnic, religious and linguistic minorities, women in rural areas, and women who live in poverty or extreme poverty. A series and/or combination of austerity and fiscal consolidation measures often provokes cumulative adverse impacts for women.

83. In the view of the Independent Expert, gender-responsive policymaking should be an essential requirement for conducting a human rights impact assessment of economic reform policies. To that end, States and other stakeholders should ensure women's participation in the process, especially those who are likely to be affected and those groups of women most exposed to the negative impacts of the reforms. Given that women are not a monolithic group and there are significant differences in terms of identity, status, access to resources and agency, systematic data collection would be important in order to identify and anticipate the impacts of such measures on the women who would potentially be affected.

84. Human rights impact assessments, with a clear gender focus, can better ensure the realization of women's human rights by addressing structural socioeconomic barriers. It is important to note that policies that might improve overall social indicators might not do so for women. In Latin America, for example, while overall income inequality seems to have decreased, female poverty rates have increased, and, more specifically, young women of reproductive age are more likely to live in poverty than their male counterparts since they cannot gain access to the labour market in the absence of public care services.[72] All this proves that impact assessments of economic policies must be gender transformative in order not to pay lip service to human rights.

85. The Independent Expert concludes that the prohibition of impermissible retrogressive measures that disproportionally discriminate against women should be embedded in the discussion of economic policy reform. In other words, the design, monitoring and implementation of economic policy reforms should be guided by the principles of non-discrimination, the progressive realization of economic, social and cultural rights, and the use of the maximum of available resources. Discriminatory economic policies cannot be justified on the basis of the need to achieve short-term

[72] UN-Women, *Turning Promises Into Action: Gender Equality in the 2030 Agenda for Sustainable Development* (New York, 2018).

macroeconomic targets and without regard to the human rights and gender impacts. Such policies should also not try to mitigate the extreme social impacts for certain groups only. Economic policies that give rise to impermissible retrogressive measures against women or certain groups of women are illegal from a human rights perspective.

86. Furthermore, the Independent Expert emphasizes that the positive impacts of investing in the care economy are potentially exponential. Not only do such investments have positive effects on women's income and time, but they may also serve to address the more fundamental determinants of gender inequality by facilitating a shift in gender norms. Governments can play a role in that regard by funding high-quality childcare, reliable child-support payments, paid parental leave for men and for women, and providing working mothers with the resources necessary to compete in some traditionally male-dominated sectors on an equal footing with men.

87. In preparing the present report, the Independent Expert has learned that during times of economic crisis, public investment in childcare and elder care creates virtuous cycles by which the investment not only addresses the care deficit through the delivery of crucial care services, but also kick starts a multiplier effect in generating jobs (usually for women), which puts more money in the hands of households (usually low-income households), which, in turn, reduces social spending through reduced payments of unemployment benefits, and increases the income of and consumption tax revenues from the newly employed workforce.

88. International financial institutions (and many States) have adopted an instrumentalist gender agenda that focuses almost exclusively on growth. Although polices resulting in gender inequality in pay may indeed boost growth, the issue of gender equality cannot be reduced to women's labour force participation and should not be approached as a separate or emerging issue. The agenda of international financial institutions should be reshaped and bound by human rights considerations. International financial institutions should urgently address the impact of prescribed macroeconomic policies, lending and technical assistance on women's opportunities to exercise their right to work, to social protection and to gain access to public services. Women's disproportionate unpaid care burden, limitations on their ability to exercise choice over their economic activities, and the adverse gender implications of regressive tax regimes should also be urgently addressed.

89. Macroeconomic policies will continue to fail to address structural gender inequalities as long as the collective voice of women's rights advocates and feminist economists is sidelined and ignored in economic decision-making. A recent positive example was the choice by Iceland to deal with its financial crash and banking collapse in 2008–2009 in a human rights- and gender-sensitive manner (see A/HRC/28/59/Add.1 and A/HRC/26/39). The country's quick recovery shows that policies that discriminate against women are not the only possible response in the face of economic crises.

VII. Recommendations

90. **In relation to his conclusions, the Independent Expert recommends that States:**

1. **Create an enabling macroeconomic environment for gender equality, in particular by:**

(a) **Undertaking independent, participatory, informed, transparent and gender-sensitive human rights impact assessments of economic reform**

policies. In doing so, States should consider alternative policies that avoid, or at the very least minimize and remedy, potential adverse effects on gender equality and women's human rights in designing and implementing economic reform policies;

(b) Identifying and effectively addressing measures that could entail retrogressive effects for women's human rights, foreseeing, for example, negative outcomes with respect to the distribution of unpaid care work;

(c) Identifying and avoiding economic reforms policies that would have far reaching implications for the enjoyment of several human rights by women and that might lead to direct, indirect or cumulative discrimination. It is crucial to recognize the heightened vulnerability of specific subgroups of women and to tailor the responses accordingly;

(d) Evaluating government spending, taxation, debt and monetary policy for their effects on gender equality and women's human rights and addressing impacts that might be detrimental;

(e) Addressing gender biases in tax systems and raising taxes effectively and progressively from those who have greater incomes. That means, among other things, ensuring that companies are paying their fair share of taxes, including by curbing tax incentives, and increasing the share of tax revenue from direct taxation of income and wealth, instead of relying on indirect taxes such as VAT;

(f) Using gender-responsive and participatory budgeting, involving civil society organizations, at all levels of Government to ensure that sufficient resources are allocated to implement laws, policies and programmes that promote gender equality;

(g) Using countercyclical macroeconomic policies to reduce the risk and impact of economic shocks, which disproportionately hit women. States should use fiscal policy to maximize their available resources for the progressive realization of women's human rights, in line with article 2.1 of the International Covenant on Economic, Social and Cultural Rights;

(h) Conducting ex ante and ex post human rights impact assessments with a robust gender dimension when negotiating trade and investment agreements;

(i) Establishing mechanisms to ensure information-sharing between the communities affected and policymakers, to ensure that the implementation of economic policy is monitored and adjusted according to its impact on human rights and gender;

(j) Providing gender-oriented human rights training in relation to economic policies to all government officials, ministers and parliamentarians, especially those who are engaged in making and implementing economic policy.

2. Recognize, redistribute and reduce unpaid care and domestic work, in particular by:

(a) Recognizing unpaid care and domestic work as valuable work, taking into account the actual economic value and contribution of such work to the economy and including it in national accounts;

(b) Funding gender disaggregated time-use surveys that monitor time spent on such work on a regular basis;

(c) **Redistributing unpaid care work from households to the public sector by investing more public funds in the care economy (that is, in caring for people with disabilities, children and the elderly, as well as healthcare);**

(d) **Ensuring that high-quality care services are accessible and affordable to all, taking into account all possible family structures without any kind of discrimination;**

(e) **Supporting the equal redistribution of unpaid care and domestic work between men and women through measures such as paid maternal and parental leave;**

(f) **Reducing the time it takes people to provide high-quality care and domestic work by investing in labour-saving equipment and infrastructure, with a view to ensuring the exercise of the rights to water, sanitation, work, housing, health and education, and investing in essential services such as electricity and public transportation;**

(g) **Protecting the rights of unpaid care workers by promoting the inclusion of those with unpaid care responsibilities in political activity and economic decision-making, introducing labour regulations that enable those undertaking unpaid care work to also engage in remunerated work, and ensuring that unpaid care work does not reduce access to social protection.**

3. **Prioritize policies that promote the right to work, in particular by:**

(a) **Promoting and protecting labour regulations that promote the right to just and favourable conditions of work, including decent work, collective bargaining and freedom of association, thereby ensuring that women enjoy decent work equally with men. States should ratify the Convention on the Elimination of All Forms of Discrimination against Women, the International Covenant on Economic, Social and Cultural Rights and the Optional Protocol thereto, and ILO Conventions No. 100 (on equal remuneration) and No. 189 (on the rights of domestic workers);**

(b) **Supporting the proposed ILO convention on gender-based violence and harassment in the world of work;**

(c) **Setting and enforcing living wages at adequate levels as a way to realize greater gender equality in pay and a decent living for workers and their families. States should guarantee rights relevant to collective bargaining on wages and reverse reforms that have reduced the coverage of collective agreements;**

(d) **Ensuring that employment regulations and social and legal protection are extended to cover workers in the informal economy and throughout the supply chain. Migrant workers should be protected in countries of origin, destination and transit;**

(e) **Creating more decent work for women, including by investing in jobs in the public sector, where women are disproportionately overrepresented, and funding targeted job creation schemes.**

4. **Address the adverse effects of economic reforms for women through a robust social security net, in particular by:**

Ensuring access to social protection for all throughout their lives, without regard to employment, migration or any other status, and ensuring that women will not be excluded from such access. Given the number of women in the informal sector and the vast amount of time that women spend on unpaid care

work, the introduction of universal non-contributory social protection is essential.

5. **Ensure consultation with and the informed participation of women's rights organizations, social partners and civil society, in particular by:**

Ensuring the equal, full and meaningful participation and representation of women at all levels in the design, monitoring and implementation of policies, including feminist experts, women's rights organizations and women from marginalized groups, including through, for example, holding open consultations on budgets, trade agreements, and other major economic policy decisions with women's human rights organizations and other relevant stakeholders.

91. **The Independent Expert recommends that international financial institutions effectively contribute to gender equality, in particular by:**

(a) **Ensuring that loan programmes are agreed upon only after human rights impact assessments with a clear gender dimension have been conducted, and that any potential deficiencies are remedied;**

(b) **Addressing risks of negative impacts on women's human rights resulting from conditionalities, monitoring the impact of subsequent reforms and proposing an alternative policy mix if adverse gendered impacts from the proposed conditionalities are identified;**

(c) **Acknowledging that the elimination of gender discrimination requires substantial and sustained public investment, including in social and physical infrastructure, and that, therefore, promoting a fiscal rollback by the State can be counterproductive in achieving the realization of women's human rights;**

(d) **Developing policy advice with a focus on raising sufficient domestic revenue in equitable ways to assist countries in making better use of income, capital, property and wealth taxes;**

(e) **Making use of progressive taxation and ensuring that measures and mechanisms that may lead to more effective redistribution of resources between women and men are used.**

92. **In line with the present report and his conclusions, and in keeping with the Guiding Principles on Business and Human Rights, the Independent Expert recommends that businesses:**

(a) **Create conditions that enable women to engage in employment, in accordance with human rights standards and principles, including those of equality and non-discrimination;**

(b) **Ensure that their practices and activities do not contradict or weaken the role of the State in promoting and protecting women's human rights;**

(c) **Comply with human rights standards, including those on equality and non-discrimination in relation to women, when undertaking corporate restructuring measures in the face of economic downturns;**

(d) **In addition, business associations should take proactive measures to encourage and build the capacity of their members to respect human rights and gender equality.**